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ABSTRACT

The curriculum guide is intended to provide creative and academic enrichment for gifted students in regular classrooms of grades 3, 4, 5, and 6. Introductory information includes a discussion of the Three Stage Model, characteristics of the able student, and instructions for using the guide. Individual lesson plans are provided for the following areas: language arts, math, science, social studies, art, creative problem solving, and independent study. Each lesson plan includes objectives, motivational activity, directions for the instructional activity, followup suggestions, source, and relevance. A final section lists instructional materials used in the program. Each listing includes name, author/developer, publisher, price, and a description. (DB)

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PACE

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CURRICULUM GUIDE FOR CREATIVE AND ACADEMIC ENRICHMENT

GRADES 3·4·5·6

EC142467

PACE

A PROGRAM FOR ACADEMIC & CREATIVE ENRICHMENT

Tippecanoe School Corporation

Lafayette, Indiana

Sponsored by: Indiana Department of Public Instruction
Division of Innovative Education
Harold Negley, Superintendent

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Prepared with assistance from the Gifted Education Resource Institute, Purdue University, West Lafayette, Indiana.

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*Lessons are cross referenced. For example, the lesson on page 25 of the Curriculum Guide is classified as both Arts and Language Arts.

THE THREE STAGE MODEL FOR ENRICHMENT OF ABLE STUDENTS

The PACE program, implemented in the elementary schools in the Tippecanoe School Corporation, is based on the structure provided by the Three Stage Model developed by John Feldhusen and Penny Britton Kolloff of the Purdue Gifted Education Resource Institute. The purpose for the model is to present a framework upon which to develop enrichment programs for gifted and creative students. Feldhusen and Kolloff feel that any program which is not developed from a sound theoretical base may have inarticulated goals and directions and thus is not a defensible, qualitatively differentiated program for highly able students.

The components of the Three Stage Model can be implemented in any curriculum area, in any organizational format, at any grade level. Since the model is process oriented, with the eventual products to be determined by the individual students, the teacher selects the activities and experiences to present to the students initially, while allowing students to gradually assume this responsibility as they become more experienced. The Three Stage Model may be applied to the traditional curriculum areas or may be used with materials specifically developed for academically able and creative students.

The broad goals of the Purdue Three Stage Model are:

1. To develop gifted students' basic thinking abilities.
2. To help gifted students develop more adequate self concepts by providing small group interaction with other gifted students.
3. To help gifted students develop their intellectual and creative abilities through challenging instructional activities.
4. To help gifted students become more independent and effective as learners.

THE THREE STAGE MODEL FOR ENRICHMENT OF ABLE STUDENTS

STAGE I

Stage I is concerned with the development of the basic thinking abilities, both convergent and divergent. As we consider the traditional elementary school curriculum, we find that the majority of questions and problems posed to our students are convergent in nature; that is, they have one correct answer. While it is important for students to acquire the basic convergent skills such as number facts, computational skill, spelling and grammar, and certain factual material in science and social studies, we recognize that this knowledge is only one small part of what our able students will be expected to demonstrate as they become adults. Much of what adults, particularly gifted adults, are asked to do as productive individuals, is to generate ideas in quantity, to come up with ideas and suggestions which no one else has thought of, to develop ideas fully. These abilities must be fostered from early childhood in order that individuals become adept at applying them in real life situations. Activities which are presented in Stage I are teacher selected, relatively short term, and designed to foster these basic thinking abilities, specifically fluency (the ability to come up with a large number of responses), flexibility (the ability to think of responses in a variety of categories), originality (the ability to generate ideas which no one else in the group has thought of), and elaboration (the ability to develop an idea fully). There are a number of excellent sources of Stage I activities, and teachers will see Stage I possibilities in many curriculum areas and textbooks as they gain familiarity with this type of activity. In addition to presenting Stage I activities for the students to complete in class, we have found great success in presenting students with this type of material as a challenge outside of class, perhaps to share with the family. Often the students will take a Stage I activity and develop their own challenges to be presented to their classmates and teachers.

One of the most critical aspects of Stage I, as well as the other stages, is the objective of the activity. We feel that it is imperative to have the objectives clearly in mind for each activity, and frequently to share the objective with the students. The purpose for this is to keep the program and activities from degenerating into "fun and games" which may occur without clear and stated knowledge of the outcomes of the activity.

STAGE II

Following a period of skill building in the Stage I realm, the students are ready to move into Stage II of the model. It is at this point that students begin to apply their abilities to the area of problem solving. Beginning with experience in question asking, identification of assumptions, and brainstorming, students may apply these techniques to the solution of specific, short term problems such as those presented in 20 Questions or Minute Mysteries. Following this introduction to Stage II, students practice various strategies for problem solving such as Forced Association, Bionics, Synectics, and Morphological Analysis. These strategies, with suggested problems and examples, can be found in Feldhusen and Treffinger's book Creative Thinking and Problem Solving in Gifted Education (1980). When students have had an opportunity to practice these skills, they are ready to go on to the Creative Problem Solving Model (see page 168). The model is followed carefully in a group situation using a practice problem so that students can see how the model is used to structure the process. We find that after several guided experiences with this model, students are able to apply the model themselves, using real life problems, problems from various subject areas or hypothetical problems. A natural transition from this group problem solving effort is to an individual problem solving situation.

STAGE III

After a number of experiences in the Stage II activities, students are ready to move into the highest level of the model, Stage III, which is independent study. This is the area in which students are expected to spend most of their time and effort. It is also the most difficult of the stages to implement, since independent study, for most students, is far from independent in the initial phases. One might expect highly able students to possess concomitant self direction and task commitment. This is likely not to be true of most students as they initiate their independent studies. The first phase, selecting a topic, requires guidance in narrowing the topic to a manageable size. Many students will decide on topics such as Space Travel, Horses, Art, all of which need to be significantly limited before students can plan their study. It is appropriate for students to narrow these topics to such aspects as Apollo XIII, Work Horses, and Cartooning, in order to have a subject which they can explore comfortably.

The nature of the topic is an important consideration at this point. There are a number of students for whom independent study is a new experience, and they may want to select something about which they already know a great deal. This gives them security on their initial Stage III activity; we have found that this may be just what they need to get started. For this reason we do not discourage them from their initial choice, no matter how familiar or non-academic. After their first successful experience with independent study, it is easier to direct them toward the unfamiliar or the more scholarly topic.

The next phase of the independent study requires the student to plan the course of the study; including the use of resources and materials, steps involved in carrying out the study, time needed, and possible end product. This may effectively be accomplished by using contracts (examples on pp.209-10). At the outset of independent study, many students experience difficulty in the planning phase, but with guidance they become more realistic in their expectations.

Selection of resources merits special consideration since, for some students, this means going to the encyclopedia to copy several paragraphs of information on the subject. This is the point at which a librarian-media specialist can be an excellent resource person, acquainting students with the Reader's Guide, reference books and materials, periodicals on special topics, the vertical file, appropriate filmstrips, films and records.

Once students have gathered information, the question becomes, "How can I best present what I have learned to others?" This is one of the most important aspects of Stage III. Our goals include sharing our work with other audiences and culminating the studies with appropriate products. Many students seem conditioned to think in terms of a written report at the end of a period of study, when in fact a slide show, a graph, a demonstration, or a poster may communicate the study much more effectively than a narrative summary. Brainstorming with classmates is a good way of generating ideas for products. Once the study is completed, it is important to decide on an appropriate audience for the presentation. It may be the student's classmates, it may be a classroom of younger children, it may be a school assembly, or it may involve people from outside the school such as a local historical association.

Although we reach Stage III after a period of Stage I and Stage II activities, we never abandon these previous stages. Stage I activities provide excellent challenges when used as warm-ups and take home activities. Stage II provides opportunity for real life or hypothetical problem solving in various curriculum areas. Both early stages allow for breaks from the independent study phase which may be desired by students and teachers.

The Three Stage Model provides opportunities for the development of skills and abilities critical to the academically able and creative student. If the model is implemented systematically, the basic goals stated earlier in this description should be attained and these students will benefit from a qualitatively different program.

THE ABLE STUDENT

Teachers have always had able students in their classes and have recognized them by certain characteristics and behaviors. Perceptive teachers realize that able students are found in all schools, in all socio-economic levels and in all ethnic and racial groups. Many teachers are also aware that students may be superior in a variety of areas other than the traditionally recognized general intellectual category. Superior ability may also be found in specific academic areas such as math, social studies, science, or the language arts. Students with a specific academic aptitude reveal this ability through their high performance on standardized tests, their high achievement in school work in the area of superiority, and their interest in learning more about topics in that area. These students appear to see relationships and grasp principles more quickly than others. They are able to generalize and synthesize in the content area.

Creative thinking is another ability which may be identified in some students. Those individuals who are exceptionally creative may or may not be the same students who are academically able. For this reason, an effort must be made to seek out those who possess creative thinking ability. The creative student is one who has an adventurous mind, one who comes up with many ideas, alternatives, and questions. This student is an original thinker, one whose ideas are unique in comparison with the peer group. The creative thinker generally exhibits a sense of humor and is a risk taker. Creative students are sometimes seen as disruptive or as discipline problems because of their uninhibited behavior, their impulsive reactions and their non-conformist tendencies. Creativity is also the behavior which characterizes many able people who have not had opportunities to develop to their full potential academically or intellectually. These students include members of minority groups and low income families, students who are geographically isolated, and some who have physical or learning handicaps. Teachers may recognize in these children expressive or dramatic abilities, richness in verbal expression in informal situations, physical ability in dance and creative movement, humor, and productive behavior in small group interactions. An observant teacher will note these creative characteristics in children who would not traditionally be recognized as having special ability.

The purpose for identifying these various types of able students is to provide differentiated experiences which are commensurate with their needs. These students are frequently capable of mastering the curriculum more quickly than the average student. They are able to go much deeper into their areas of special ability and interest than other students. Their needs are such that, when motivated and guided, they can pursue learning on their own. These students do not need to be held to the levels at which their classmates are operating; they do not need more of what everyone else is doing; they do not need to be told to "sit quietly and read a book" when their work is finished.

The able student does need to be permitted to demonstrate that the basic learning has been mastered and that he/she is ready to go beyond this basic learning. The able student does need to be encouraged to select alternative learning activities at a higher level or a faster pace. The able student does need to develop the skills and knowledge to proceed independently in special learning activities. Most important, the able student needs the opportunity to work with and interact with other able students.

HOW TO USE THIS GUIDE

This guide contains lessons developed and taught by PACE teachers during the first year of the program. After this period of evaluation, we feel confident in offering the lessons to the classroom teacher to use for enrichment of the able students in the regular classroom.

Lessons are presented in a standard format which gives the objective(s), the motivation or what the teacher does to initiate the lesson, a description of what the able student is to do, and suggestions for extension or follow-up of the lesson. Because these lessons are designed specifically for able students, a brief statement is included which explains the relevance of the lesson to the capable student. Each lesson is also keyed to the appropriate stage of the Three Stage Model.

There are several ways in which a teacher may choose to use this guide. Having identified a student who could benefit from enrichment in a particular subject area such as math, the teacher may use the math section of the guide to locate perhaps a geometry or number patterns lesson which the able student can work on while the rest of the class continues with the regular assignment.

Frequently there are small groups of able students within a classroom who would benefit from enrichment. The guide may be used to select activities for small group work under the guidance of a teacher.

Many lessons are appropriate for adaptation to a learning center format in which the necessary materials and instructions are presented to the able students and they proceed independently.

An additional method of providing enrichment is to establish a place in the classroom, possibly a portion of a bulletin board, as a "Challenge Corner" where activities, brain teasers, puzzles and other appropriate Stage I activities are presented and all students who are interested may participate. Able students should be encouraged to participate in this type of activity but, of course, no student would be discouraged from taking part in this activity.

The question is frequently raised as to whether able students should participate in enrichment activities instead of the regular assignments or in addition to the regular assignments. It seems logical that if the able student has already mastered the concepts and skills which are being presented to other students, as is so frequently the case in such areas as math, spelling, and reading, it would be appropriate to allow the student to extend these skills and concepts by becoming involved in selected enrichment activities. When new or unmastered skills and concepts are presented, the able student needs to participate and practice until mastery is achieved at which time he/she may continue with the differentiated curriculum.

It is expected that many teachers who use this guide will desire additional materials and lessons to differentiate for their able students. In order to provide for these requests, we have included an annotated bibliography listing all of the resources which have been used in our preparation of lessons and activities. Addresses and prices of materials are current as of June, 1981. Each material is classified as to the curriculum area or type of skill, and the appropriate stage or stages of the Three Stage Model and a description of the material detailing contents, format, and suggestions for teacher use is provided.

LANGUAGE ARTS

OBJECTIVES:	To encourage creative speech, flexibility, and originality To provide opportunities for students to develop similes
MOTIVATION:	Discuss similes and give examples such as "as cold as a polar bear's nose".
ACTIVITY:	Students develop their own similes. As happy as... As cold as... As empty as... As tired as... As small as... As clear as...
FOLLOW-UP:	Share similes with the group.
SOURCE:	Valerie Montgomery,PACE teacher. Creative Growth Games *, p. 59-60.
RELEVANCE:	Students are able to develop original responses. A knowledge of similes can enhance students' oral and written development.

OBJECTIVE: To stimulate creative thinking
This short span activity can be used as a starter for other activities or as an exercise in creative thinking

MOTIVATION: Ask a question from "Quick Liners for a Thursday Morning," Sunflowering, p. 51.
"If you had to escort a visitor from outer space for a 30-minute tour of your community, where would your tour begin and end?"

"Which of your numbers would hurt the most if you were a dial telephone?"

"Which weighs more, a promise or a mistake?"

"Which is more intelligent, a period or a question mark?"

ACTIVITY: Students consider the question and brainstorm possibilities.

SOURCE: Sunflowering *, pp. 14, 24, 33, 51, 64.

RELEVANCE: The Quick Liners require students to approach problems from different perspectives, encouraging flexibility and originality.

OBJECTIVES: To improve fluency and flexibility
To create an awareness of words

MOTIVATIONS: "Today we are going to play some word games. You may be silly or serious, but whatever you do must make sense. You will be given some letters of the alphabet. Make sentences using the letters, in the order given, as the first letter of each word. Here is an example: suppose you had the letters 'M__D__P__T__.' From these letters you can make the sentence "My dog plays tricks," or "Many dads pitch tents."

ACTIVITY: Students write as many sentences as possible using the given letters.

1. s, i, t, c
2. b, c, a, d, p, t

Encourage flexibility by asking students to try different sentence structure, and/or punctuation.

FOLLOW-UP: Students may share their words with others. They might want to select their best sentences for sharing.

SOURCE: Thinking Kabyn*

RELEVANCE: Because able students tend to have a large vocabulary, the activity gives them an opportunity to use words they know but might not ordinarily use.

OBJECTIVES: To improve flexibility
To increase originality

MOTIVATION: "Here is a word puzzle called Wacky Wordies[1]*. It is a clever way to present a common phrase or figure of speech. Can you decode them?"

ACTIVITY: Students decode those presented and invent their own.

FOLLOW-UP: Students make a ditto of their Wacky Wordies and distribute it to teachers and parents.

SOURCE: Games Magazine*, July-August, 1980,p. 26.

RELEVANCE: This activity provides challenging word play. It also provides experience in decoding (solving others' Wacky Wordies) and in encoding (thinking of a message and of how to present it.

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[1]* Wacky Wordies are puzzles in which letter and word arrangements determine meaning. (e.g. you just me is just between you and me).

Dear Teachers & Parents,

These are Wacky Wordies invented by the students in the PACE class. The second sheet lists wacky wordies from GAMES magazine.

The object is to discern a familiar phrase, saying, cliche, or name from each arrangement of letters and/or digits.

Teachers, please feel free to share these with your classes.

(Credit to student inventor in parentheses)

wowolfol (S. Swain)	DR. DR. (S. Swain)	irighti (D. Miskin)	GI__ CCC (S. Swain)	chair (D. Miskin)	shiningknightarmour (W. Peak)
ba$nk (B. McKee)	stand Do you (C. David)	nosockse (S. Morrison)	water swim (W. Peak)	end end (Tim Cobb) end end	LOFALLINGVE (B. McKee)
side ___ ___ ___ ___ (M.Vanetten)	S T A R (B. McKee)	paantsnts (J. Frankenberger)	b u n n y (R. Thompson)	back + 1/4 (C. Long)	pearpartridgetree (N. Wilensky)
LEVEL LEVEL (M. Ewbank)	tistitchme (N.Wilensky)	sail c c c c c c c	tiwrinkleme (B. Fisher)	F~~A~~NMEC~~K~~	everyrightthing (S. Swain)
sea NFL NBA NHA ABA AFL up to 20,000 (T. Tilford)	stand I				ground feet feet feet feet feet feet (S. Swain)

Answers to Wacky Wordies:

wolf in sheep's clothing	paradox	right between the eyes	G.I. overseas	high chair	knight in shining armor
money in the bank	Do you understand?	Sock in the nose	swim under water	tight ends	falling in love
sidelines	falling star	ants in the pants	bunny hop	back and forth	partridge in a pear tree
split level	stitch in time	sail over the seven seas	wrinkle in time	don't fence me in	right in the middle of everything
20,000 leagues under the sea	I understand				six feet under the ground

OBJECTIVES:	To encourage choice of words to evoke figural imagery To extend creative writing experiences and skills To increase fluency and flexibility
MOTIVATION:	Read example from Sunflowering, p. 55. "What is loud? Loud is squeaky shoes in a library room, a tiger's stripes, a yowling dog, a playground, a hurt feeling, a summer storm, red and white polka dots, a mouthful of peanuts, a teachers' lounge."
ACTIVITY:	Give each child a word. "What is squeamish? eerie? small? durable? incredible? poetic? bitter? huge? noble? green?" (Sunflowering, p. 55) Encourage students to write down all things that evoke that particular concept. Write a poem-like list of mental images that bring this word to mind.
FOLLOW-UP:	Write a dictionary using these definitions. Use these new ideas in a descriptive story.
SOURCE:	Sunflowering *, p. 55
RELEVANCE:	Students need experiences in creative expression within a structured setting. This activity is structured to relate images to the stimulus word. The range of creative images is limitless.

OBJECTIVES:	To improve self-concept To promote discussion
MOTIVATION:	"Can you find a word in your name, (such as ice in Janice)? This is a memory aid to help remember each others' names."
ACTIVTTY:	Students complete worksheet (next page), and discuss their experiences.
FOLLOW-UP:	Encourage listening to one another. Encourage conversations about one another's interests and hobbies.
SOURCE:	Janice Gudeman, PACE teacher
RELEVANCE:	Able students have a variety of interests and hobbies. This activity provides an opportunity to share these.

Find a person in the room who fits one of the descriptions below. Place his or her name on the worksheet in the appropriate space provided. Continue until all blanks are filled.

FIND A PERSON WHO:

Has read a book for fun in the last week	
Plays a musical instrument	
Has planned and carried out an original experiment	
Makes up brain teasers, puzzles, or riddles	
Has a pen pal from another state or country	
Has had an original poem, story, or other composition published	
Has an unusual pet	
Has been to a museum	
Has used a computer	
Has visited a foreign country	
Would like to become President	

LANGUAGE ARTS - I

OBJECTIVES: To encourage creative thinking and imagination

MOTIVATION: Discuss recipes and various measurements. "What is a souffle?"

ACTIVITY: Brainstorm ingredients for Happiness Souffle.

FOLLOW-UP: Create recipes for additional abstract concepts (e.g., Friendship Cake). Brainstorm nonsense words. Choose one and create a recipe for it.

SOURCE: Sunflowering*, p. 12.

RELEVANCE: This activity allows free, uninhibited use of imagination and creative thinking.

HAPPINESS SOUFFLE

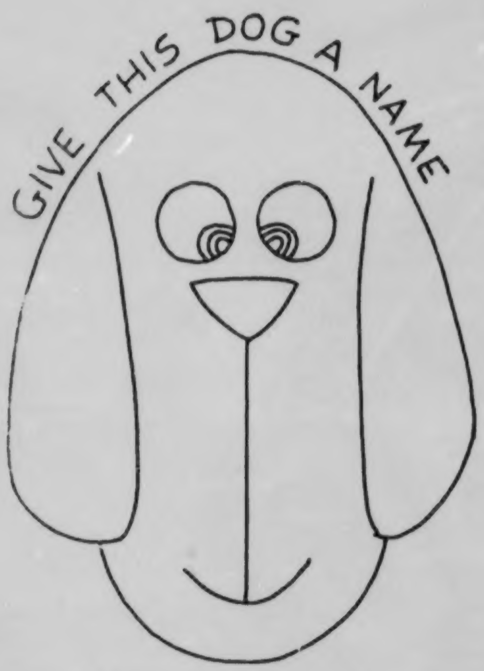
3 c. love
1 lb. sweetness
2 c. truth
1 lb. faithfulness
1 lb. sharing
1 c. kindness
1 tblsp. forgiveness
3 c. fun
1 c. tenderness
1 lb. smiles
1 tblsp. cheerful tears
1 lb. family
5 c. friends
1 tblsp. compliments
1 c. good grades
2 c. pets
1 tblsp. pep
1 c. marriage
1 pinch gaiety
1 c. good health
1 tblsp. giving
10 c. thankfulness

Put it in the oven at 313 degrees. Let it bake 4 hours. Put in a large pan and serve to friends.

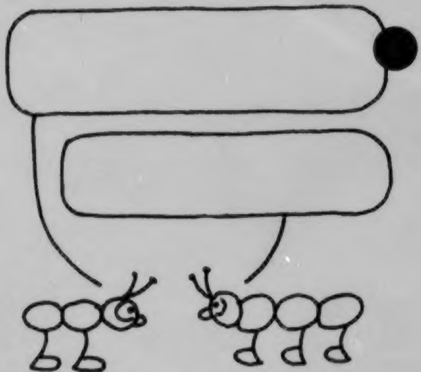
Grade 5, Klondike Elementary

OBJECTIVES:	To foster creative thinking, particularly originality and flexibility To encourage the use of imagination
MOTIVATION:	Discuss the use of imagination by inventors, by writers, by artists. Emphasize the use of original ideas.
ACTIVITY:	Give students a copy of Dog Namer, (next page) and point out that there are opportunities for creating something original both verbally and figurally. Allow students to select any or all of the activities on this page and complete them before sharing ideas with anyone else in the group.
FOLLOW-UP:	There are a number of activities of this nature in many of the books used with able students. It is also appropriate to ask students to select one of their ideas to elaborate. Display the responses and discuss the different ways creative individuals perceive and respond to a task.
SOURCE:	Thinking Creatively, Grades 4-6, Instructo: McGraw-Hill, 1978, p. 18.
RELEVANCE:	This is a typical Stage I activity, emphasizing the creative thinking abilities and the use of the imagination.

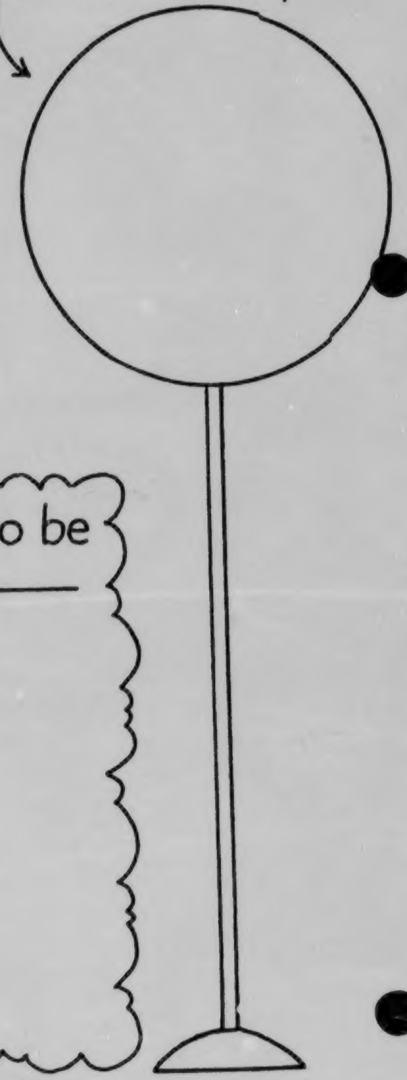
*Dog Namer: ______________ (18)


GIVE THIS DOG A NAME

Draw a lazy line meeting a nervous line.



Design a stop sign without the word stop.



Make up a silly recipe for "Anymano."

I would like to be the number ____ because:

*Used with permission from:
Thinking Creatively, Copyright 1978, by Instructo/McGraw Hill, Paoli, PA.[14]

OBJECTIVE: To encourage fluency, flexibility, and originality

MOTIVATION: Brainstorm a list of favorite cartoon heroes.

ACTIVITY: Students fill out individual sheets (see next page). They can share some of their best names.

FOLLOW-UP: Students may draw one of the characters in detail. They may want to develop a cartoon situation for their character.

SOURCE: New Directions 3, "What's in a Name? (b)." Harper & Row, Publishers, Inc. 1973.

RELEVANCE: This activity requires students to be original and offers students the opportunity to take part in creative writing from a different perspective.

From New Directions Harper and Row, Publishers, Inc. 1973

"3 What's in a name? (b)"

Have you ever thought about how the heroes of comic strips got their names? Comic strip characters often have unusual names that tell us something about the kind of people or animals they represent. For example, Flash Gordon is a spaceman, Dennis the Menace is a little boy who is always getting into trouble, and Snoopy is a silly dog who likes to act like a human being.

Pretend that you are going to write a comic strip about each of the characters below. See if you can think of two names for each of these characters. Try to think of interesting and colorful names that will make people want to read about your characters.

A cowboy ____________________
____

A detective ____________________
____

A singing crocodile ____________
____

A talking bulldozer ____________
____

A witch ____________________
____

A silly elephant ____________
____

An absent-minded astronaut
____
____

A medieval knight ____________
____

LANGUAGE ARTS - II
SELF-CONCEPT

OBJECTIVES: To enable students to brainstorm and discuss ways of meeting experiences of hardship
To enable students to learn more about the thinking processes by discussing questions about "The Ugly Duckling"

MOTIVATION: "What is a special or differentquality, feature, or characteristic about yourself?"

ACTIVITY: Respond to the questions on "The Ugly Duckling". (See next page.)

SOURCE: Janice Gudeman, PACE teacher

RELEVANCE: Able students can benefit from an understanding of someone who overcomes disappointments and suffering with determination to use his/her talents. They can study and identify with the lives of other creative people.

"The Ugly Duckling" by Hans Christian Andersen

The life and stories of Hans Christian Andersen will be introduced. Hans was a sensitive child, and preferred daydreaming, playing with his puppet theatre made by his father, and making up stories. He suffered from his friends' jokes, but he left for Copenhagen determined to overcome his hardships. How would you have coped with his situation?

Discuss how he experienced hardship before others grew to appreciate his work.

The purpose of this also for them to understand the symbolism of "The Ugly Duckling" and how he felt about his own life. Encourage acceptance of self and others.

Why did the hens, wild ducks, and others make fun of the duckling?

During what time of the year did the little ducklings hatch?

What brought about the change that the duckling was later loved by the children and his friends?

What would you have done and how would you feel, if you were the duckling and misunderstood by others?

What would you have done and how would you feel toward the duckling if you were his brothers or sisters?

How could this story relate to any of your feelings or events in your own life? How do you feel you should react and feel toward someone who is different? How would you want others to feel and react to you in this situation?

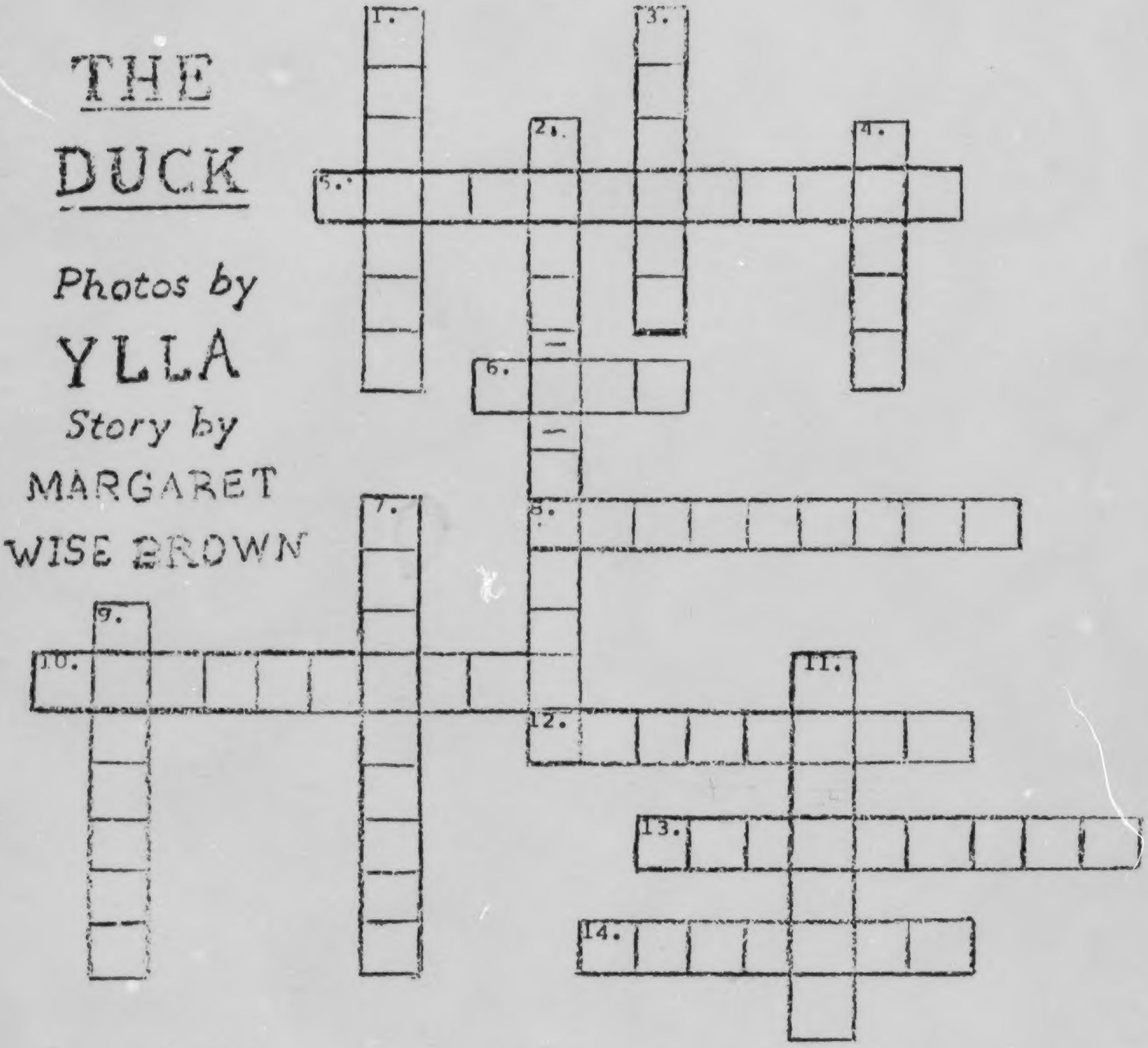
Do you feel the cat and hen had the right attitude toward the duckling? Why or why not?

Do you agree with the swan at the end of the story after so much hardship, he could now appreciate all the happiness that there was to welcome him? Does this relate to any of your experiences?

OBJECTIVES:	To stimulate interest in children's literature To build vocabulary To increase flexibility
MOTIVATION:	Crossword puzzles are a good way to extend and develop your vocabulary. Here is an opportunity for you to make one of your own.
ACTIVITY:	"The crossword puzzle on the next page has been made from the vocabulary of the book The Duck by Margaret Wise Brown" (The key is at the bottom of this page.) Make a list of high-level vocabulary words from the book you are reading. Create a crossword puzzle using these words. Graph paper is helpful.
FOLLOW-UP:	Duplicate your crossword puzzle for your classmates.
SOURCE:	Janice Gudeman, PACE teacher.
RELEVANCE:	Characteristics of able students are that they have an interest in reading and a large vocabulary. This activity provides an opportunity to explore and manipulate words.
KEY:	Across: 5. hippopotamus; 6. fawn; 8. orangutan; 10. respectful; 12. elephant; 13.chuckling; 14. curious. Down: 1. gorilla; 2. cock-a-doodle; 3. Behold; 4. dunes; 7. fluttered; 9. terrier; 11. raccoon.

THE DUCK

Photos by
YLLA
Story by
MARGARET
WISE BROWN



Across

5. Large animal of the hog family
6. Young deer
8. Ape with shaggy hair
10. Showing honor and courtesy
12. Large animal with a trunk
13. Laughing softly
14. Eager to learn or know

Down

1. Largest and most powerful ape
2. Sound made by a rooster
3. Look! See!
4. Ridges of sand
7. Flapped the wings rapidly
9. Active, intelligent, small dog
11. Animal with black masklike markings

LANGUAGE ARTS - I, II
CREATIVE PROBLEM SOLVING

OBJECTIVE: To enable students to approach a problem from another perspective

MOTIVATION: Sometimes you must reverse a problem to get a solution. Read "It's in the Bag".

"It was the sixteenth hole in the annual Bob Hope tournament play. The tall, handsome newcomer, who looked very much like Bing Crosby, had an excellent chance of winning. His iron shot had fallen short of the green, and he had a good chance of making a birdie. Smiling broadly and singing, "Thanks for the Memories," he bounded down the fairway, then stopped short in utter dismay. His ball had rolled into a small paper bag carelessly tossed by someone in the gallery -- although it was whispered that Bob Hope had placed it there. If he removed the ball from the bag, it would cost him a penalty stroke. If he tried to hit the ball and the bag, he would lose control over the shot. For a moment, he stood there pondering over the problem. Then, to Bob's chagrin, he solved it. How did he solve it?"*

ACTIVITY: Students try to solve the problem.

FOLLOW-UP: Students may bring in their own problems.

SOURCE: Creative Growth Games*, p. 49.

RELEVANCE: This problem is appropriate for able students because solving it requires insight and perserverance.

*He reached into his pocket, extracted a book of matches, lit one and set fire to the bag. When the bag had burned to ashes, he selected an iron, swung, and watched the ball roll to the rim of the hole. Unable to get the ball away from the paper bag without a penalty, this golfer was imaginative enough to recognize that the problem could be solved by getting the paper bag away from the ball."

OBJECTIVES: To encourage deductive reasoning
To encourage fluency and originality

MOTIVATION: Read the paragraph which presents the characters, their situation, and a problem:

"Ann lived on a farm. Every day she rode the school bus six miles to and from school. One day, after a week of hard rains, the old bridge over Silver Creek washed away. The bus couldn't get the children from school to the farms on the other side of the creek."

ACTIVITY: Students finish the story on paper in some interesting and logical way, solving the problem.

FOLLOW-UP: Students share solutions. They can combine solutions or choose the one they feel best solves the problem and presents an interesting story.

SOURCE: Think Big*, p. 44.

RELEVANCE: Students need opportunities to draw upon their reasoning skills and creativity. This activity requires both: focusing upon a problem and predicting the outcome, then combining these elements into a creative story.

LANGUAGE ARTS - I, II
CREATIVE PROBLEM SOLVING

OBJECTIVES: To introduce the concepts of fluency, flexibility, originality, and elaboration

MOTIVATION: Introduce the unicorn "OFFE" based on the content of I Believe in Unicorns. (The letters of the unicorn's name stand for originality, fluency, flexibility, and elaboration).

Using encyclopedias, look up unicorn. Each student may relate a piece of information about unicorns to the group.

Discuss the etymology of the word unicorn. The prefix uni is from the Latin unus meaning one. List other uni words.

ACTIVITY: Discuss the meanings of the creative thinking abilities; fluency, flexibility, originality, and elaboration.

Present one or more activities from I Believe in Unicorns* (Stanish).

Help students score their responses for fluency, flexibility, originality, and elaboration.

FOLLOW-UP: Encourage students to select a particular goal, such as increasing flexibility, for subsequent activities. They can measure progress toward that goal and keep a record of their progress.

Some students may investigate unicorns in mythology, or in literature (Thurber), and present their findings.

SOURCE: Suzanne Cole, PACE teacher

I Believe in Unicorns *

RELEVANCE: This activity is an excellent foundation for creative thinking activities. Making students aware of the creative thinking abilities and helping them evaluate their own creative thinking behaviors will provide them with a tool for achieving the goals of a differentiated program.

LANGUAGE ARTS - I, II
CREATIVE PROBLEM SOLVING

OBJECTIVES: To utilize the right hemisphere of the brain, which is involved in imaginative and intuitive activities

To provide inspiration for creative writing, emphasizing originality

MOTIVATION: Have students close their eyes. Urge them to concentrate only on imagining themselves in the situation given.

Tell them that the ideas and images they have, as individuals, will not be like any other person's.

ACTIVITY: "Picture something you like to eat. Write it down."

"Visualize something you like to touch. Write it down."

"Picture a river with a tree beside it. Briefly describe what you see."

"Listen and hear a sound you enjoy. Write down what it is."

"Imagine something you like to smell and write what it is."

"Jot down a few words to describe how you feel right now."

Then: "Draw a circle on a piece of paper. Choose one of the images you were most interested in and write ideas, words, and phrases related to that image or experience. After you have written in the circle, generate 3 or more possible titles for stories that could be based on that image or experience. Choose one title and write a short story."

FOLLOW-UP: Another day, students repeat the activity using new stimuli.

SOURCE: Wermuth, Linda. Imagination and Language, Prentice Hall Learning Systems, Inc., Englewood Cliffs, N.J.

RELEVANCE: Students need experiences to utilize their capacity for creativity in directed situations.

LANGUAGE ARTS - I
ART

OBJECTIVE: To demonstrate that emotions do have physical properties
To increase fluency and flexibilty

MOTIVATION: "What is the color of love?"
"What is the color of hate?"
Students discuss these perceptions, giving reasons to support their responses.

ACTIVITY: Students discuss other sensory properties of emotions, sharing their perceptions.
"What is the shape of kindness?"
"What is the shape of a hurt feeling?"
"What is the size of loneliness?"
"What is the size of friendship?"
"What is the sound of fear?"

FOLLOW-UP: Expand the idea that emotions have physical properties and follow-up with the idea that physical phenomena have emotional properties, (e.g., a field, a sunny day).

Students may use art materials to create an imaginary hat shop by making a hat of loneliness, a hat of happiness, a hat of friendship, etc.

SOURCE: Sunflowering*, p. 25.

RELEVANCE: Able students will realize that it is possible to give physical properties to abstract ideas, and not to be tied to "rote" description.

OBJECTIVES:	To give a structured opportunity for creative thinking To write creatively
MOTIVATION:	"We are going to Scamper." Directions for Scampering are given on page 165 of this guide. Review the rules. "The name of the Scamper is 'Light Bulb'."
ACTIVITY:	Read "Light Bulb", pp 45-47, from Scamper. (See next page.) Children close their eyes and use their imaginations. Students write what they imagined when they were flying.
FOLLOW-UP:	Students can illustrate what they saw in their imaginations. Students may want to share their writings and illustrations.
SOURCE:	Scamper: Games for Imagination Development.* pp. 45 - 47
RELEVANCE:	With guidance, students can imagine interesting possibilities. This activity may yield better quality, more descriptive writing because students are drawing on a vivid, recent mental experience. "Creative imagination is the ability to form unique, novel, and original mental images." (Scamper, p. 12.) Able students have a vast memory store from which they can adapt and/or combine components to produce creative ideas.

From Scamper: Games for Imagination Development
Robert F. Eberle The D.O.K. Publishers, Inc. 1971
pp. 45-47

"LIGHT BULB"

"We have so many wonderful things to help us live comfortably that we really don't give much thought to it. But if somebody hadn't given some thought to these things they would have never been invented. Have you ever thought what it would be like if light bulbs had never been invented?...I wouldn't like that, would you?...Light bulbs help us in many, many ways. But I think we could make them even better than they are now. I'm sure we could make them better... if we use our imagination.

LIGHT BULB

Put a light bulb in your left hand...Hold it out in front of you.. Very good. Now we are going to ask the light bulb to do whatever it is that we wish it to do. You may have to wish very hard for the light bulb to get your message, but let's try it and see if the light bulb will do what we desire it to do...Wish for the light bulb to turn on... Is it on?...Turn it off...Now let's have the light bulb shine different colors. What color do you desire? Red? Green? Blue? Orange? Is there any color that you desire?...Wish for the light bulb to shine whatever color you want it to shine...Did it shine your color?...Would you rather the bulb shine warm or cold?...Take your choice and have the light bulb shine the way you want it to...Do you feel the temperature changing in the room?...Put the light bulb aside...

Now put a light bulb in each hand...Hold your arms out straight to the side...Pretend that your light bulbs are jet engines and run down the street for a take-off...Run faster...Faster yet...Zoom yourself up into the air...Higher...Higher...Circle over your house... Look down...Do you see anyone you know?...Now zoom over town and look down...Do you see any stores?...Zoom away from town and look down at the river...Zoom away and look at the mountains...Look at the ocean... Zoom back toward home...When you are over your house let loose of the light bulbs and have them zip away into space...Open your parachute and float slowly to the ground...As you float down, look all around you...You are heading toward your back yard...Touch your feet down, take off your parachute, and go tell people that you are home...I'll bet you never thought you could make a jet plane out of light bulbs...Nothing is very hard to do...if you use your imagination."

"Light Bulb" from Scamper

I saw an ocean, Jessica Fox, a graveyard, a ghost, and several stores. Jessica Fox looked like a tick or flea and her hair shone like a piece of metal shining at the sun.

My light bulb engines were switching colors off and on. I saw my dad coming from his airplane and met him in an airplane. He was the co-pilot. I had another parachute so I lent it to my dad and we jumped out. Boy! Did it tickle my stomach! I landed with a complaint.

Amy B. Grade 4

I was zooooooooooooooooooooooooooming up in the air like a big big bird, and everything on the ground was like tiny ants. I could feel the wind blowing all around me. My light bulbs were getting very hot and flickering in the dark, like candles.

David S. Grade 4

I was going up a long way. It was a nice sunny calm day. When I flew over the river, it was so clear that I could see the bottom and the fish. Whenever my light bulb was supposed to be a color I wanted it to be, it flashed on and off different colors. The buildings looked like shacks, only nicer. When I was over the ocean, I was up so high it looked like a large lake. When I was over the mountains, it looked like Aspen was Dayton.

Anisa Grade 4

I saw the Pacific Ocean. Skiing on the ocean I saw Popeye. The mountains look like hot fudge sundaes but these look like the size of play mountains you play with in your room. The river looks like a wiggly snake going every which way. The ground looked like it was laid off in squares. On the way we hit some rough air. All you did was go up and down.

Becky I. Grade 4

OBJECTIVES:	To become aware of relationships between words To increase fluency in creative thinking
MOTIVATION:	Using two words, such as house and happy, create a sequence of words which will relate the first to the last. (e.g. house, family, child, birthday, party, happy)
ACTIVITY:	Student writes a word on the top line of his/her paper. Then s/he writes a related word on the line below. Continue until student has written 5 or 6 words.
FOLLOW-UP:	To share, student says, "_____(the first word) and _____(the last word) are related because..." and explains his train of thought.
SOURCE:	Sunflowering*, p. 57
RELEVANCE:	Able students have the ability to see relationships easily. They may practice this skill by seeking relationships between ideas represented by words. They are likely to see unique and/or unusual relationships.

LANGUAGE ARTS - I
SOCIAL STUDIES, SCIENCE

OBJECTIVES: To encourage creative written expression
To increase fluency and originality

MOTIVATION: "The answer is marshmallow. What's the question?"

ACTIVITY: Students write as many questions as they can in the time allowed. (Stop work after the majority of students are no longer actively involved.) Students evaluate their questions, starring their two best to share with the class.

FOLLOW-UP: Teacher explains how to score for creativity. Each student scores his own work for fluency (1 point for each question written). Teacher scores for originality (1 point for each question no one else has written).

Discuss the scoring of the game Boggle which uses the same originality scoring.

Use this exercise to review content from social studies or science. "The answer is Great Britain (or friction). What's the question?"

SOURCE: 72 Ways to have Fun with My Mind *

RELEVANCE: Able children have a tremendous capacity for creativity but they need opportunities to develop it. (See student samples below.) This activity "rewards" two components of creativity: fluency and originality.

Students' responses to this activity:

What's another name for a calm swamp? - Kathy G. Grade 5
What did the elephant sit on in the cocoa? - Becki K. Grade 5
What are the little pink, orange, and green pieces in Lucky Charms?
- Kim K. Grade 6

OBJECTIVES:	To enable students to write descriptive sentences To encourage fluency To develop visual imagery from language
MOTIVATION:	Present an example, such as, "When I'm happy I'm like a jumpy new puppy who wiggles and licks everyone's face."
ACTIVITY:	Students choose an emotion or feeling to express in writing.
FOLLOW-UP:	Write descriptions for other emotions or feelings such as sad, grumpy, shocked, frightened, etc.
SOURCE:	_Sunflowering_*, p. 58.
RELEVANCE:	Able students need to be stimulated to go beyond the normal assignments. They need to learn that they can express themselves with imagery and clarity.

OBJECTIVE: To encourage creative verbal associations

MOTIVATION: Introduce the idea of analogies. e.g. "Sun is to moon as day is to _____" "How are a box of cereal and a tank of gas alike?" (both are used as fuel).

ACTIVITY: Students work independently on list of associations (see next page). Students compare answers and post a list of unsolved associations for later consideration.

FOLLOW-UP: Students bring in an original analogy to the next class meeting.

This lesson can be used as a warm-up for a synectics lesson.

SOURCE: Creative Growth Games*, pp. 15-17.

RELEVANCE: This activity requires high level creative synthesis.

"THINK OF A FIFTH WORD THAT IS RELATED TO THE PRECEDING FOUR WORDS. CONSIDER COMPOUNDS, HYPHENATED WORDS, OR COMMONLY USED EXPRESSIONS.

EXAMPLES:

1. Sleeping, contest, spot, shop
   Answer: Beauty (sleeping beauty, beauty contest, beauty spot, beauty shop)
2. Style, love, jacket, span
   Answer: Life (life-style, love life, life jacket, life span)

NOW TRAIN YOUR OWN ASSOCIATIVE POWERS WITH THE FOLLOWING SETS.

1.	bug	rest	fellow	cover	____________
2.	cross	baby	blood	ribbon	____________
3.	see	carpet	hot	cent	____________
4.	touch	palate	soap	sell	____________
5.	easy	hush	belt	order	____________
6.	tree	cup	cake	forbidden	____________
7.	wagon	stand	aid	dance	____________
8.	dust	movie	gaze	sapphire	____________
9.	tooth	talk	potato	bitter	____________
10.	alley	date	snow	spot	____________
11.	call	nap	burglar	hep	____________
12.	rest	post	linen	fellow	____________
13.	bulldog	cuff	toast	windows	____________
14.	opera	no	box	stone	____________
15.	brain	watching	bath	house	____________
16.	wire	out	feed	play	____________
17.	studies	work	science	welfare	____________
18.	storage	shoulder	comfort	cream	____________
19.	walk	new	scape	beam	____________
20.	business	suit	wrench	shine"	____________

From: Creative Growth Games, by E. Raudsepp

(answers on following page)

1. bed
2. blue
3. red
4. soft
5. money
6. fruit
7. band
8. star
9. sweet
10. blind
11. cat
12. bed
13. French
14. soap
15. bird
16. chicken
17. social
18. cold
19. moon
20. monkey

OBJECTIVES: To increase fluency and flexibility in descriptions
To enable students to use elaboration skills by selecting descriptive words to fit a pattern of an acrostic*

*To write an acrostic, the author selects a word for a subject and begins each line with a letter of that word.

MOTIVATION: List all the words you can think of that describe winter (or a sport, pet, etc.). Together, the class writes an acrostic about winter.

ACTIVITY: Each student lists on his paper all the words that describe his/her - likes, dislikes, appearance, feelings. Students select words from that list or create other words from those on the list to fit an acrostic pattern for their name or nickname.

FOLLOW-UP: Write an acrostic for a special friend or a parent or family member to be used as a gift. (Good for Mother's Day, birthdays.)

SOURCE: Barbara G. Ilgen, PACE teacher

RELEVANCE; Brainstorming for descriptive words is open-ended, drawing upon a well-developed or at least readily accessible skill. The second part of the activity forces students to evaluate and select from the words in part one to fit a pattern. Children need to develop these evaluation and selection skills.

Entering Southwestern
Valentine committee
Enjoys skateboarding
Likes to roller skate
Yells in cheerleading
Never stops talking
Evie P. Grade 6

Nutty
Excited easily
Enjoys sports
Turkey
Entertaining people
Rambunctious
Silly
Anita H. Grade 6

Loving
Intelligent
Tiny
Tricky
Lively
Entertaining

Beautiful
Interesting
Take to bed.
Amy B. Grade 4
(written for her pet)

Handsome
At the top
Nice
Cocky
Outstanding
Considerate
Knowing
Ted H. Grade 6

Kan't spel two grate
Animal lover
Talks too quietly
Has freckles
Yells at boys' games
Kathy G. Grade 5

OBJECTIVES: To enable students to describe an unfamiliar object so clearly that it creates an accurate mental picture
To increase the skill of careful observation
To point out the need for thoroughness in descriptive writing

MOTIVATION: "If you were going to describe an object to someone who hadn't seen it, what aspects or properties would you have to describe?" Students will suggest identifying characteristics such as color, shape, size, feel, use. Teacher records these on board.

ACTIVITY: Teacher shows such an object. Students write descriptions of this unusual object.

FOLLOW-UP: Each description is given to a child who has not seen the object. That child illustrates the object from the description. This picture is returned to the writer, providing excellent feedback. Writer can see where his/her description has succeeded and failed. (Much more graphic and dynamic than teacher comment.)

SOURCE: Barbara G. Ilgen, PACE teacher.

RELEVANCE: Able students need clear feedback on the quality of their work. Because they usually are "good students" they often avoid critical review of their work. In this activity any lack of completeness or thoroughness is pictorially obvious to them. Similarly, clear descriptions yield accurate pictures - a deserved reward.

LANGUAGE ARTS - I, II
SOCIAL STUDIES

OBJECTIVE: To enable students to synthesize component parts of seemingly unrelated objects

MOTIVATION: The group speculates on the changes resulting from the interchange of historical figures from two different eras.

ACTIVITY: Discuss outcomes of making these interchanges, not only obvious and immediate conclusions, but long range consequences. Other possible topics of interchanges: Interchange the functions of the executive branch of government with functions of the judiciary. Interchange the writing style of Dr. Seuss with the speaking style of a national newscaster.

FOLLOW-UP: Write own interchanges.

Develop an interchange and carry it as far as possible to conclusion.

SOURCE: Sunflowering*, p. 47.

RELEVANCE: Able students can see relationships and perceive analogies, both of which higher level thinking skills.

LANGUAGE ARTS - I, II
ART

OBJECTIVES: To build communication skills
To build listening skills

MOTIVATION: " 'Listen' to a rainbow. Describe a rainbow to someone who cannot see. Be creative. You are helping someone to 'see' with their ears."

"You are telling someone your thoughts. How do you want them to listen to you? What are the characteristics of a good listener?"

Discuss courtesy in listening, empathy, and listening with care. A speaker notices his audience. We need to be "active" listeners, as members of the audience.

ACTIVITY: Communication Activity. Divide into groups of two. Arrange your chairs back to back. Draw an animal, design, or common object. Describe what you have drawn to your partner. Your partner will try to draw your drawing, following your directions. S/he does not look at your drawing. After completion, compare your drawing with your partner's drawing.
"Are your drawings similar?"
"How can you improve your directions?"
Change roles.

Try one-way communication. Your partner cannot ask questions.

Then with another drawing, your partner can ask questions: two-way communication.

FOLLOW-UP: Share your drawings with the group.

Divide into groups of two. One student states thoughts and ideas. The other tries to restate the message in other words to help understand the meaning. "You think..." "It seems to you that..." Change roles.

SOURCE: Janice Gudeman, PACE teacher

RELEVANCE: Able students have verbal proficiency. This activity builds listening skills. Communication activities help build skills to express ideas.

LANGUAGE ARTS - I
ART

OBJECTIVES:	To develop elaboration and divergent thinking To help them think about meanings of words and to illustrate them
MOTIVATION:	Show students examples of illustrated words, (see next page).
ACTIVITY:	Students draw illustrations of words' meanings, using the word itself in their drawings.
FOLLOW-UP:	Students display illustrated words.
SOURCE:	Schaefer, Charles E. Developing Creativity in Children, Word Designs Idea No. 45, D.O.K. Publishers, Inc. Buffalo, N.Y. 1973. p. 74.
RELEVANCE:	This activity gives able students an opportunity to use their large vocabularies in creative ways.

UP

FIRST

DOWN

DUST

HAPPY ICE Sicles

NAILS

by Wend

LANGUAGE ARTS - I
ART

OBJECTIVES: To encourage flexibility
To encourage use of imagination

MOTIVATION: "Take the first part of gorilla and the last part of giraffe, and you have an animal called a goraffe. Mix alligator with elephant, and you have a creature called an alliphant or an elegator.

ACTIVITY: "Write a list of animals. Mix these names and create comical names of animals. See how many unusual animal names you can create."

"Draw your animals."

FOLLOW-UP: "Draw some pictures of strange-looking birds. Combine three birds' parts into a new creature. Name it. Let others see these comic birds."

Variation: Someone names a new creature and each student draws an impression of this bird. (For example, what drawings appear of a Red-headed Fliptip or a Duck-billed Squawker?)

Talk about manners. Create manners for the animal kingdom, and the funnier the better. For examples: A gentleman cat allows a mouse to do some of the chasing. A beaver does not permit his gnawed trees to fall on his friends' heads.

SOURCE: Unknown. Lesson submitted by Janice Gudeman, PACE teacher.

RELEVANCE: In this activity, students look at the usual in new ways.

OBJECTIVES: To give opportunities for creative thinking
To encourage originality and elaboration
To teach method of writing articles

MOTIVATION: Talk about mythical and nonsense animals. Show examples.

ACTIVITY: Using coloring books, cut up animal pictures and create a nonsense animal. (Paste and color.) Write a descriptive article as it might appear in an encyclopedia.

FOLLOW-UP: Share story and picture with class. A possible extension is to study mythical and/or unusual animals.

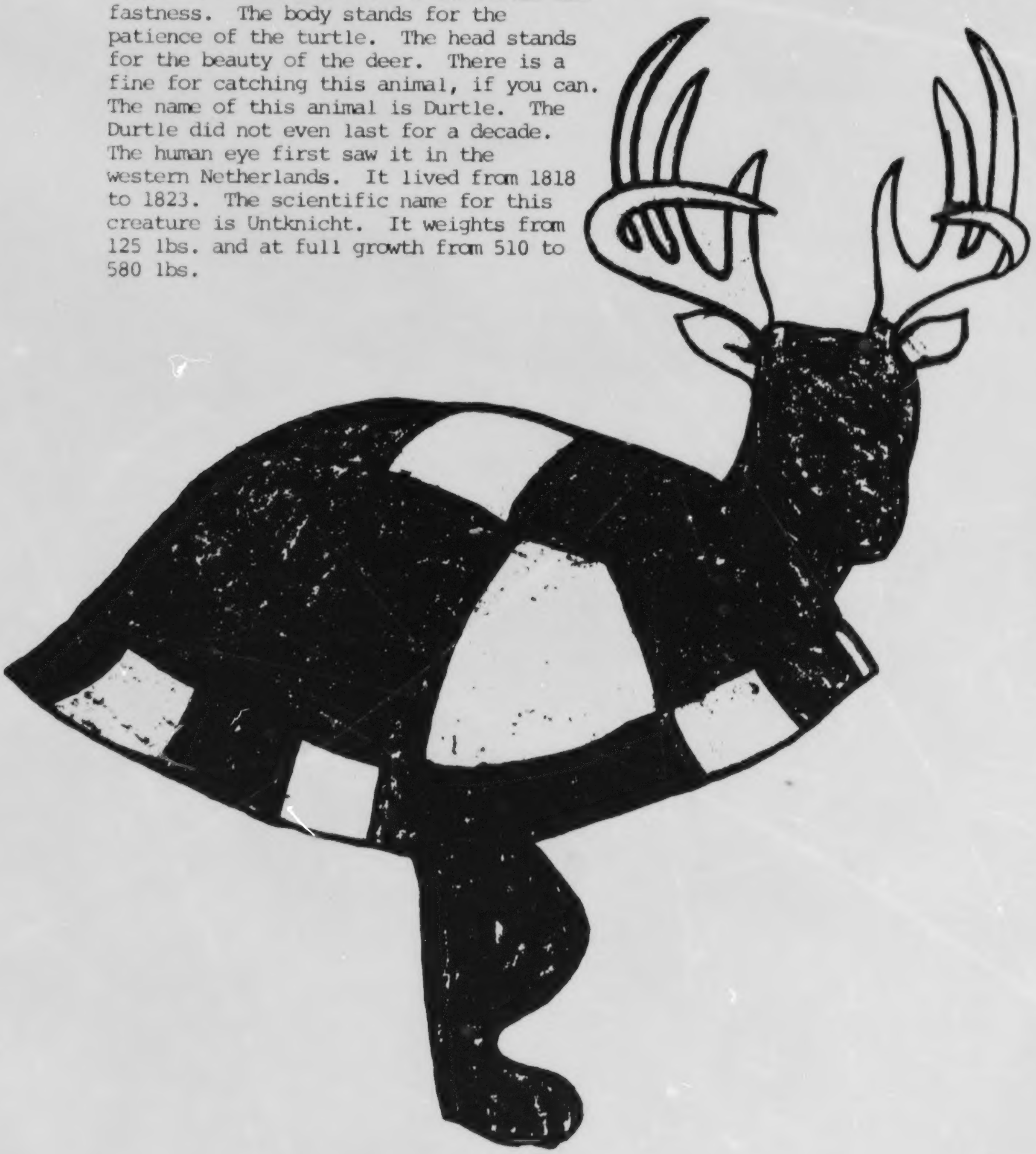
SOURCE: Sunflowering*, p. 31.

RELEVANCE: The experience of writing an encyclopedia description is appropriate for developing descriptive writing skills.

DURTLE

by Mike K.

This animal is the symbol of freedom for the country of Netherlands. The legs stand for a cheetah for its swiftness and fastness. The body stands for the patience of the turtle. The head stands for the beauty of the deer. There is a fine for catching this animal, if you can. The name of this animal is Durtle. The Durtle did not even last for a decade. The human eye first saw it in the western Netherlands. It lived from 1818 to 1823. The scientific name for this creature is Untknicht. It weights from 125 lbs. and at full growth from 510 to 580 lbs.

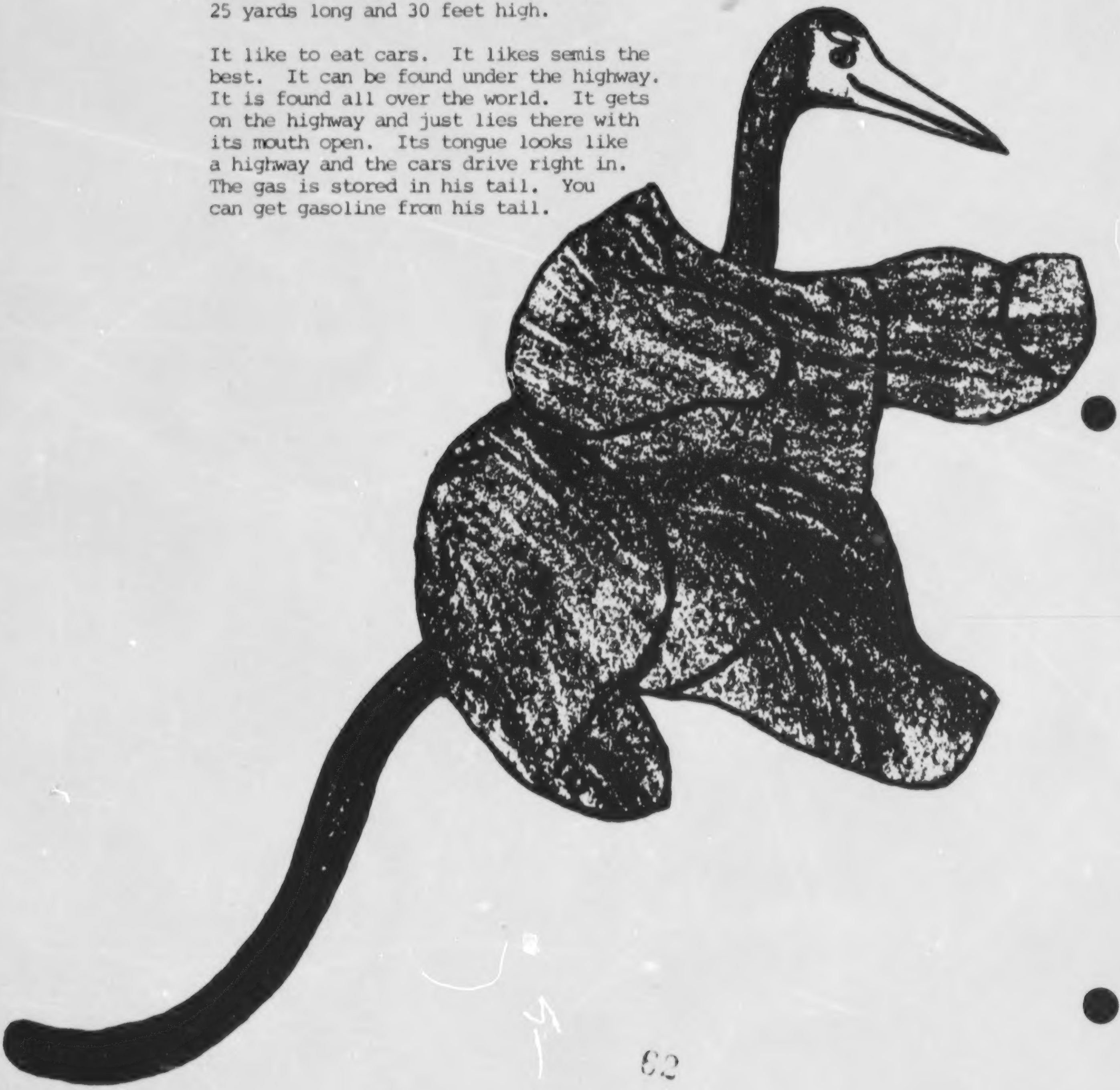


VIT

by Mike E.

Other common name - Wow wow
Scientific name - Wow wow
Family - Bears
Order - Nice
Size - Male weighs 3000 tons. It is 25 yards long and 30 feet high.

It like to eat cars. It likes semis the best. It can be found under the highway. It is found all over the world. It gets on the highway and just lies there with its mouth open. Its tongue looks like a highway and the cars drive right in. The gas is stored in his tail. You can get gasoline from his tail.



LANGUAGE ARTS - III
SOCIAL STUDIES

OBJECTIVES:

To provide an interdisciplinary approach for theme-centered independent study
To present and analyze a body of mythology important to the literary heritage of the English speaking people
To introduce classic literature

MOTIVATION:

Write "NORSE MYTHOLOGY" on the board.
Students discuss the meaning of Norse and mythology. Some of them may be familiar with other kinds of mythology and should relate the characteristics of myths.

A picture of one of the Norse gods may be presented. Students may list the attributes, may speculate about the historical period, may brainstorm questions about the god or Norse mythology in general.

ACTIVITY:

Read "Odin Goes to Mimir's Well" in The Children of Odin. Conduct a shared inquiry focusing on the following questions:
"What is wisdom?"
"Does a person have wisdom because s/he knows many facts or people?"
"What kind of people have wisdom? Does wisdom depend on age or wealth?"
"Are you wise?" "Relate an experience in your life from which you gained wisdom."
"What color is wisdom?" Have students draw wisdom. Discuss the possible symbolism of the color or abstraction used.
"What words of wisdom might you give to younger students? to older students? to parents? to teachers?"

FOLLOW-UP:

Continue reading from The Children of Odin. Suggested stories are "The Valkyrie", "Brynhild in the House of Flame:, "Thor and Loki in the Giants' City" and "Baldur's Doom".

Shared inquiry should continue.

Suggested additional activities:
Compare and contrast different versions of the same myth.
Compare and contrast Brynhild with Sleeping Beauty.
Analyze similarities and influence of Norse myths and Grimm Fairy Tales.

Class creates a book of original Norse myths.
Class or individuals study Anglo-Saxon poetry and Longfellow's poems relating to Norse myths.
Class or individuals study Iceland, Vikings, classical music related to Norse myths ("The Ride of the Valkyries" by Wagner, "Peer Gynt Suite" by Grieg).

SOURCE: Suzanne Cole, PACE teacher

The Children of Odin Padraic Column (may be found in junior high library)
Bulfinch's Mythology *
Norse Gods and Giants d'Aulaire (contains outstanding art work)
Words from Myths Asimov
Thunder of the Gods Hosford
Adventures with the Giants Sellew
Castles, Pirates, Knights, and Other Learning Delights. Glasscock and Weber, Good Apple, Inc. Box 299, Carthage, Il. 62321

RELEVANCE: Able students enjoy the mystery and intrigue in mythology. Norse mythology is not taught as frequently as Greek or Roman mythology, therefore it is an appropriate area of study to build upon the study of myths. The cultures which produced Norse mythology are a vital source of customs, laws, and language of the English speaking people. Norse myths appeal to the able child's imagination and sense of adventure with tales of giants, dwarfs, and eight-legged steeds.

OBJECTIVES:

To develop convergent thinking skills
To build vocabulary
To develop an understanding of spelling and meanings of words by the study of the origin of words

MOTIVATION:

Etymology is the study of the history and development of words. Greek etymon = true meaning and logos = word, study. For example, alphabet comes from the words Alpha and Beta, the first two words of the Greek alphabet.

Introduce a list of English words from Greek, and Greek prefixes in English words.

ACTIVITY:

Etymology Pictures.

1. Find words you would like to illustrate.
2. Find the roots of this word.
3. Make a creative drawing of the roots of the word, which show the origin of your word.
4. Share your ideas. The others can guess the words illustrated.

Here are examples:
Photograph: Greek phos = light and graphein = write. This could be illustrated by drawing a light bulb and a pencil and graph paper.
Microcosm: Greek micro = small and kosmos = world, universe. Draw small planets, sun, and stars, a small universe.
Zoology: Greek zoion = animal and logos = word, study. Draw a book of animals.

FOLLOW-UP:

Explore English words from Latin and other languages.

Compose sentences containing many words from the same root.

Close your eyes. Open a dictionary and touch any entry. Find something interesting in the etymology, meaning, or other feature of the word, and share this information with the class.

SOURCE:

Janice Gudeman, PACE teacher. Hook, J.N. History of the English Language. New York: The Ronald Press Company, 1975.

RELEVANCE:

Able students have large vocabularies. This activity provides an opportunity to explore the origins of the English language and to increase vocabulary.

OBJECTIVES:

To encourage the students to read for pleasure
To establish the concept that reading is a lifetime activity
To encourage students to share good books with others
To give experience in organizing a presentation and speaking before the class
To give an opportunity for oral reading

MOTIVATION: "When I have good news I like to share it." Give an example from your life and remind children of the toothpaste ad in which a child bursts into the room to announce the good news of no decay. Then the teacher "shares" from a book he/she is reading. Give title and author, main character(s), the time and setting if significant, and a very brief story synopsis. Then read a section from the book: an exciting portion, a funny episode, a good description. The total time should be no more than five minutes. Finally, allow two questions or comments from the class.

ACTIVITY: Students sign up on a schedule for the dates they will share. On that date, the student shares in a manner similar to the pattern set by the teacher. The teacher should share again after all the students and before another sequence begins. The schedule should be posted as a reminder.

FOLLOW-UP: The teacher may introduce structure into the choice of books by requiring that the next series be biography, science fiction, fiction, nonfiction, etc. It is important that the focus of "sharing a good book" not be lost.

SOURCE: Barbara Ilgen, PACE teacher

RELEVANCE: Probably the greatest tool that able students have for a productive life is their ability to read well. It is important to learn that reading is not just for school assignments but for enjoyment. After primary grades very little emphasis is placed on oral reading; the students need practice in reading aloud of others' enjoyment.

The selection of a portion to read requires evaluation of material for its content, length, comprehension and enjoyment by an audience. This process is a higher level thinking skill.

OBJECTIVES:

To encourage students to write daily
To encourage students to express their feelings, emotions, and thoughts on paper
To encourage students to become more fluent and more flexible in their thoughts and writing and more elaborative in their expression

MOTIVATION:

"What is a journal? Journal comes from the French word 'jour', meaning 'day'. A journal is something that is written in daily. It is a place to record thoughts, feelings, ideas, interesting things which you come across."
(The librarian may help find journals in the library to use as examples.)

ACTIVITY:

Students begin to keep a journal. They may want to buy or make a special notebook to use. It will be necessary to remind, encourage, goad, and cajole them at first to write every day. It is a habit which takes practice.
Students may keep their journals entirely private or they may choose to share certain things with others.

FOLLOW-UP:

It is possible to give a structure or theme to the writings by introducing a new word or term each week to guide the nature of writings:

Jewels
Jocundity
Jargon
Jaunts
Jabber
Jazz
Jousting
(use your imagination)

SOURCE:

Suzanne Cole, PACE teacher

RELEVANCE:

The more students write, the easier it becomes. Many able students are highly verbal, but writing does not come easily for them, nor are their verbal abilities reflected in their writing. This type of consistent writing experience should help them become able to express themselves.

LANGUAGE ARTS - II
SELF-CONCEPT
CREATIVE PROBLEM SOLVING

OBJECTIVE:	To provide a technique to help in learning how to understand themselves and others and to make wise decisions
MOTIVATION:	Each child completes the "How can I...?" Choose the "How can I...?" that will be discussed today. (e.g. How can I get my work done? How can I stop others from bothering me, while I am trying to get my work done? How can I keep my room clean? How can I practice (piano, sports, and others)? How can I save money?)
ACTIVITY:	Ask questions to clarify the goal, challenge, or problem. This will help them understand the goal. Others may offer suggestions to achieve this goal or solve this problem. Someone may record these suggestions on the board.
FOLLOW-UP:	"What can you do to begin to achieve this goal this week?" At the next meeting, talk about how they have begun to solve this problem, goal, or challenge this week. It is important to encourage them to use this technique in situations that arise in their daily lives.
SOURCE:	Janice Gudeman, PACE teacher Sisk, Dorothy. Teaching Gifted Children. Guidance and Counseling Needs of Gifted and Their Parents: Use of the Child Study Technique
RELEVANCE:	This is an opportunity for students to express their goals and feelings. They can talk and work together to help solve problems and give encouragement to others.

OBJECTIVES:	To encourage expression of different points of view To provide atmosphere in which judgment is deferred To investigate whether conclusions about character should be drawn from hearsay or general impressions
MOTIVATION:	"What do you remember about the events in the story Hansel and Gretel? Is it possible that Hansel and Gretel were guilty of crimes? Or do you believe they were innocent?
ACTIVITY:	Students may conduct a trial, role-play characters, re-examine the story, creatively improvise characters of Mrs. Salem, Friendly Woodsman, Hansel, Gretel, etc.
FOLLOW-UP:	Conduct further discussion of Brothers Grimm, fairy tales, folktales using these same objectives.
SOURCE:	Fact, Fantasy, Folklore by Greta B. Lipson Baxter Morrison, Good Apple, Box 299, Carthage, IL 62321
RELEVANCE:	This activity provides for role-play, discussion, and difference of opinion. It allows students to think about literature from different perspectives.

LANGUAGE ARTS - II
SCIENCE, SOCIAL STUDIES

OBJECTIVES: To enable students to use synectics to "get inside" a problem, view problem from a unique perspective
To enable students to express themselves fluently in writing
To enable students to draw on other information (from science and/or social studies) and apply it to this problem

MOTIVATION: (This activity could follow a lesson on conservation of natural resources, the oil shortage, etc.) "You are a drop of oil, trapped underground. What's it like? How do you feel?" "Now you are being drilled. What's this like? How do you feel?" "Now you're on the surface. What is happening to you? How is this different from being underground?"

ACTIVITY: Students respond verbally and teacher records ideas on board. Students write "What am I?", an oil riddle, or "My Life Story as a Drop of Oil."

FOLLOW-UP: Discuss as a group how oil would view the oil shortage.

Role-play conversation between drops of oil.

SOURCE: Barbara G. Ilgen, PACE teacher
(Note: This same approach can be used for almost any topic. The point is to force students to approach the problem from a different perspective.)

RELEVANCE: Able students are often very fluent verbally but their written expressions are less clear, insightful, and complete. This activity requires them to think freely and creatively about something they've never considered, then record these thoughts coherently, trying to retain the same enthusiasm and richness expressed verbally.

Dear tombstone engraver:

I'm a drop of oil. I'm underground right now, but I'm worried because some mean petroleum men are coming to drill me up and take me from my home. I hate them. Oh, no! They're sucking me up now. It's a wonder they don't burn me. I'm right! They are burning me and sending me through some little slots in a furnace. Now I'm real hot. I feel smothery. There are some crazy people smiling and saying, "How nice and warm it is in here." I feel light and floating. Now I'm a regular used up gas just suspended in air forever like a cloud.

Evie P. Grade 6

OIL

Me (a drop of oil).
I have been under the ground for billions of years and now I'm being sucked up to the surface by some machine. Now I'm to the surface and I'm being put in a barrel with all my relatives. I am being shipped somewhere by a motor vehicle and they are sucking things out of me on the way. They are taking me off the motor vehicle and putting me in a tank. Now I'm being pumped into a smaller tank where I'm being informed of the results. I hear something start to run and I'm being sucked through into a big metal engine. I'm twisting around getting hotter and hotter and I come out in a form I've never seen before. I'm floating away. Hel...hel...help!

Ted H. Grade 6

0
91
472
5683
MATH

MATH - I
ART

OBJECTIVES: To provide the opportunity for creative movement and expression
To provide experience with spatial relationships
To increase figural and symbolic fluency and flexibility

MOTIVATION: Organize students into groups of five or six.

Provide each group with a 12 foot length of yarn or string and space enough to stand apart from other groups.

Instruct the students not to talk during the activity.

Tell students to hold the string loosely with both hands throughout the activity.

ACTIVITY: Groups form a circle. (Remember, no talking).

Change formation to a square, a triangle, a right triangle, 2 triangles, a pentagon, a hexagon, and an octagon.

FOLLOW-UP: In addition to making the geometric shapes, create expressive shapes: anger, joy, fear ....

SOURCE: Secrets and Surprises*

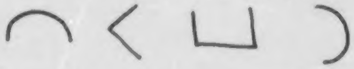
RELEVANCE: The creative student is generally able to express himself/herself in a variety of modes; verbal and non-verbal. It is important to provide able students with a variety of means of expression.

MATH - I

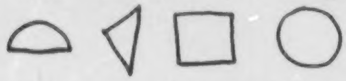
OBJECTIVES: To improve classification and discrimination skills
To extend figural skills

MOTIVATION: Present gligs, a set of figures all having one or more of the same characteristics.

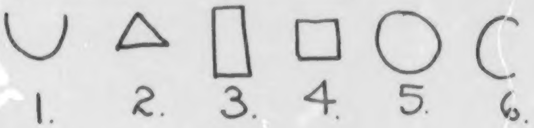
Example: All of these are Gligs.



None of these are Gligs.



Which of these are Gligs?



ACTIVITY: Students identify figures fitting each classification.

FOLLOW-UP: Students create their own classifications and name their figures. Duplicate them to share with classmates, teachers, families.

SOURCE: Basic Thinking Skills: Patterns*

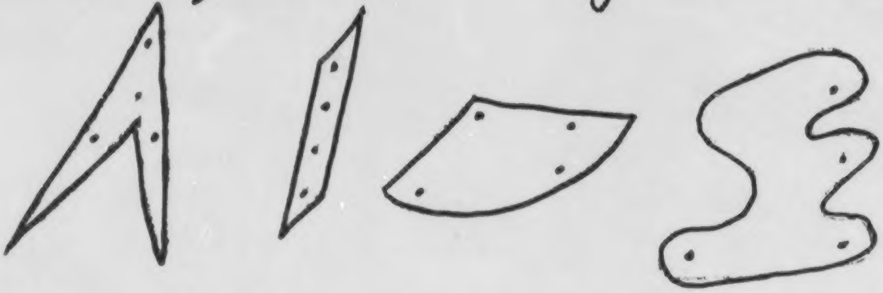
RELEVANCE: This activity requires abstract concept formation. It provides an opportunity for reasoning inductively.

Lance's Glocks

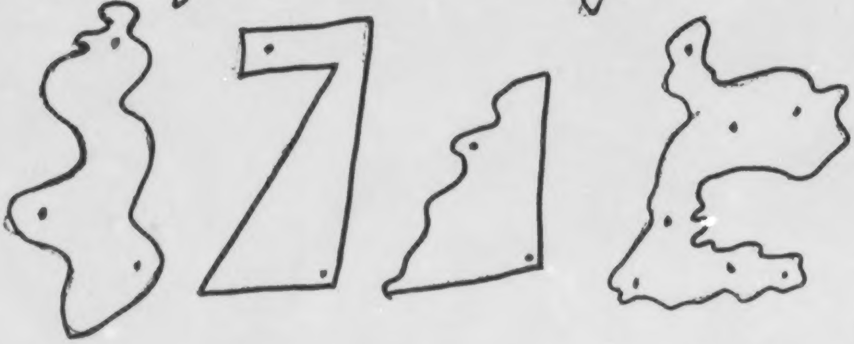
3rd Grade

0
91
472
5683

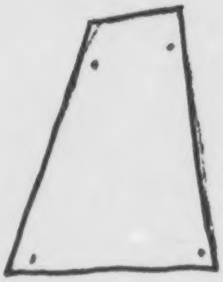
All of these are glocks.

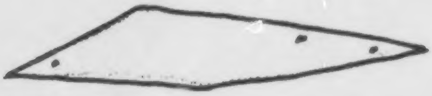


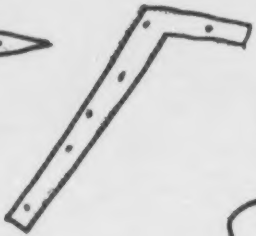
None of these are glocks.

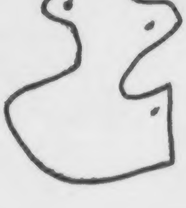


Which of these are glocks?









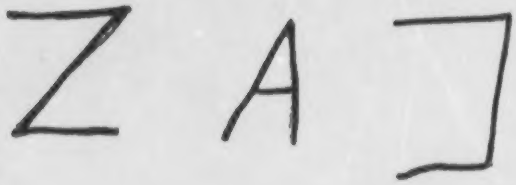
Answer: Glocks have 4 dots

4th grade

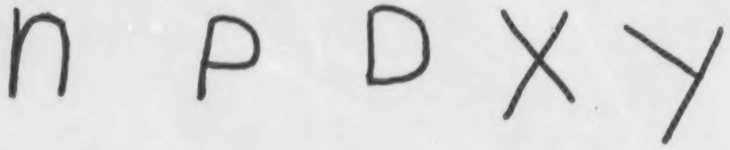
Becky's Buddles

9
0
91
472
5683

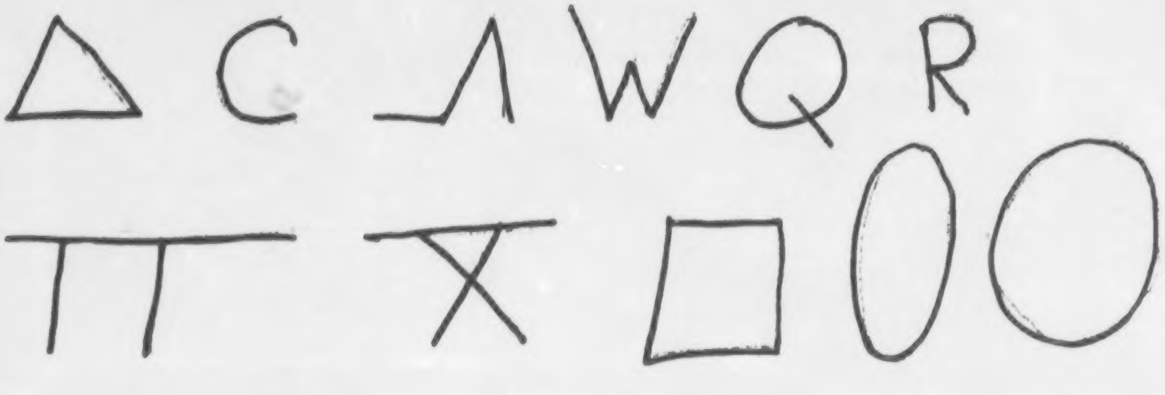
All of these are buddles.



None of these are buddles.



Which of these are buddles?



answer: Buddles have 3 straight lines.

MATH - I

OBJECTIVE: To improve fluency and flexibility with numbers

MOTIVATION: "We are going to do an unusual type of math problem. You have probably never done this kind of math before, but you only need to know how to add, subtract, multiply and divide."

Put these numbers on the board: 4 2 4 1 2 4 = 15

"Place one + sign and two - signs between the numbers to make the left side of the equation equal 15."

Work through the example with the students. (Solution - 42 - 4 + 1 - 24 = 15).

ACTIVITY: Students complete other math sentences on their own or in pairs, trying different solutions and testing them.

FOLLOW-UP: After students are competent and comfortable with these, they can make up their own problems to challenge other students.

SOURCE: Brain Stretchers*, pp. 22-24

RELEVANCE: This activity motivates able students to practice math skills. It reinforces the meaning and implications of the operations, and encourages students to look for alternative solutions.

	ADDITIONAL PROBLEMS	SOLUTIONS
1 + 1 -	6 4 2 3 2 = 16	6 + 42 - 32 = 16
2 + 2 -	8 6 2 4 4 2 = 24	8 - 6 + 24 - 4 + 2 = 24
2 + 2 -	3 2 1 3 2 1 = 6	3 + 21 + 3 - 21 = 6
2 + 1 ÷	1 2 3 3 2 1 = 15	(12 + 33) ÷ (2 + 1) = 15

MATH - I

OBJECTIVES: To increase symbolic fluency and flexibility
To give practice using the basic math operations
To increase understanding of the associative principal and signed numbers

MOTIVATION: "Using the numerals 1, 2, 3, 4 and any mathematical operations, create an equation that equals zero."
Group example: $3 + 2 - 4 - 1 = 0$

ACTIVITY: Using the same rules, write equations which equal 1, 2, 3, 4, and 5.

FOLLOW-UP: Have students write their equations on the board so that they realize that there are many ways to arrive at each answer.

SOURCE: 72 Ways to Have Fun With My Mind*

RELEVANCE: Although many students may benefit from the practice this trial and error system provides, highly able students will develop systems to deal with these operations. Their work will become less random and more controlled by "math laws".

MATH - II

OBJECTIVES: To develop critical thinking
To increase non-verbal (figural) fluency and flexibility

MOTIVATION: Present one of the puzzles (see next page) to the students, encouraging them to solve it while in the group.

Discuss the various approaches to solution suggested by the students.

ACTIVITY: Students complete other similar problems independently, and bring them to the group.

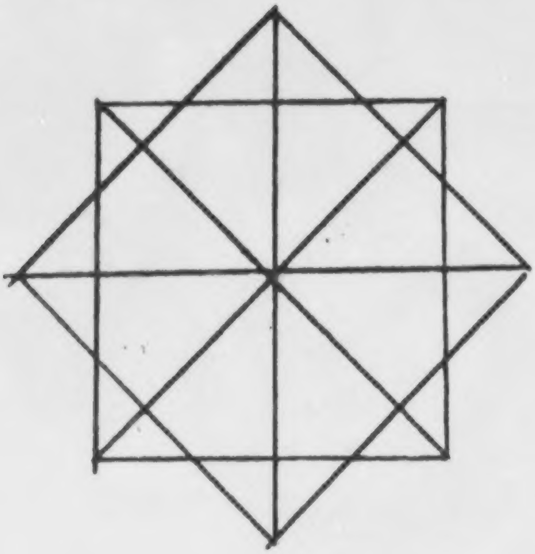
FOLLOW-UP: Students will bring in similar problems to share with others.

SOURCE: Brain Stretchers, pp. 10, 11, 46, 47, 48*

RELEVANCE: This activity promotes critical thinking. Students must work systematically, observing the visual image and thinking through the problem solving process.

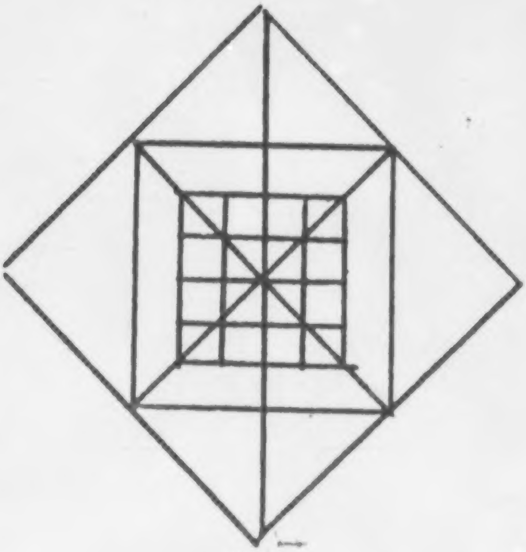
(answer - 56)

HOW MANY TRIANGLES DO YOU SEE?

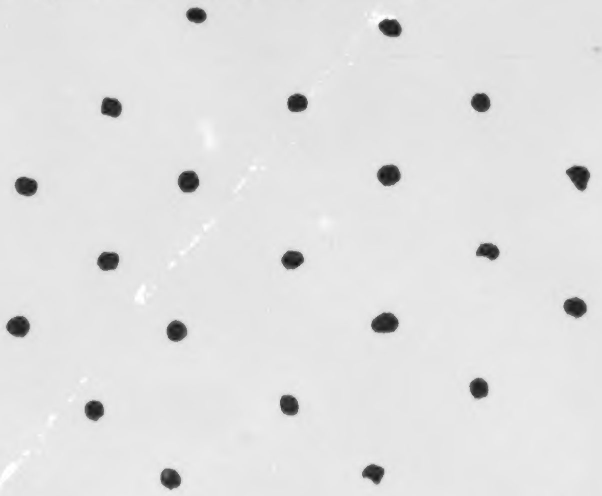


(answer - 36)

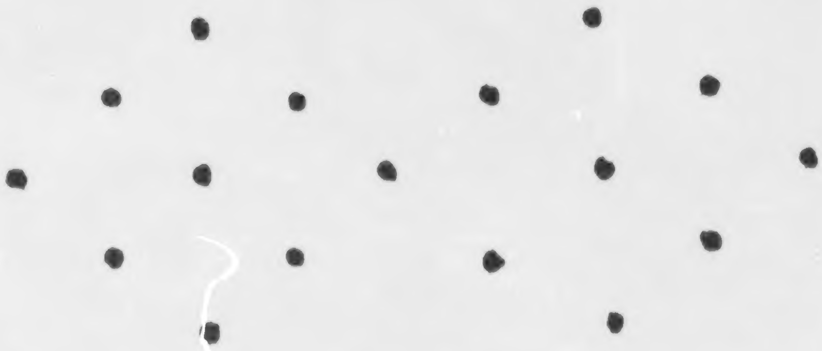
HOW MANY SQUARES DO YOU SEE?



Using only eight lines, see if you can cover the dots below. Here are the rules: do not lift your pencil, trace each line only once, and touch each dot only one time.



The dots below can be covered using seven and only seven lines. See if you can do it without lifting your pencil, without tracing a line more than once, and without touching a dot more than once.



MATH - I, II
CREATIVE PROBLEM SOLVING

OBJECTIVES: To review the fundamental concept of sorting and the relationships of order, equivalence and difference

To teach (or review) the language and usage of sets and set theory

To require the students to use logic in problem solving and the games

MOTIVATION: Pour out a box of Attibute Blocks on the table "Tell me everything you notice about them." They will quickly identify the four attributes: size, shape, color, and thickness. They will determine the characteristics within each attribute.

ACTIVITIES: Following are several activities of progressive sophistication. In each activity the teacher should utilize as much set theory vocabulary as possible and require the children to do the same. If the teacher does not have the blocks available, it is possible to make them of tagboard. It is desirable to have enough sets. A set for every 8 children would be the minimum; a set for every 4 would be ideal. Tha activities below should be done by groups of this size except where noted.

1. Attribute Difference

   One child puts an element (block) in the center of table. Each child in turn must select an element which has 1 (and only 1) attribute different from the first element. Add it in line. The next child must find another element with one attribute difference and add it to the line. Each time a child places an element, he/she should say "The attribute difference is __________."

   Make it into a game by having each child draw 3 elements to start. They may build onto either end of the line. See who can be out of elements after 3 turns. (Point out that luck plays a role: it depends which 3 elements you draw.)

   Do attribute difference until they've done it with 1, 2, 3, and 4 differences and the children work easily with attribute differences.

2. Two Dimensional Domino Game. (Two players per set)

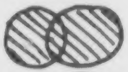
   Make a chart of 3" squares. The vertical axis has 2 differences and the horizontal axis has 1 difference. Each player draws an agreed upon

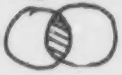
2. continued
number of elements. A non-player chooses an element from the remaining pile of elements and places it in the center square of the chart to begin the game. The player who gets rid of all his/her elements first wins. There is a tie if they get rid of them on the same turn. Determine penalties for errors that are challenged.

For the next activities, the students will need several large sheets of butcher paper on which to draw set boundaries.

3. Disjoint Sets
Instruct the students to take all the triangles and place them in one circle and take all the circles and place them in another circle.
"What would we name each of these sets?" (Set of triangles and set of circles).
"Do any elements belong in both sets?" (No).
Repeat this procedure with another attribute (color, shape, size, thickness) choosing two characteristics within that attribute. The children should discover that disjoint sets have no intersection (overlapping elements).

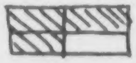
4. Union of Two Sets
Give students 2 large paper circles. Write "squares" on one and "blue" on the other. Give students a box of elements. "Sort the elements into the correct circles. Who can describe the display?" (Union of square or blue). Let them discover the intersection.

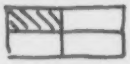
Square or blue

union

Square and blue

intersection

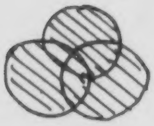
Repeat with a sheet of paper divided into 4 sections.

	Blue	Not Blue
Thick		
Not thick		

Thick or blue

union

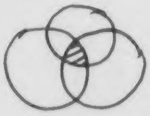
Thick and blue

intersection

5. Union of Three Sets
Do as in 4 except with 3 circles.

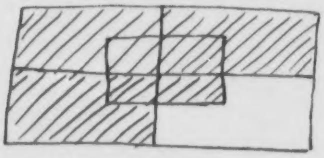


Union of 3 sets
red or small or
circle

Intersection of red
and small and circle



And with a chart.



Union of 3 sets red
or small or triangle

6. Gatekeeper I. (10 to 12 players, or less)
A child is the "gatekeeper." Without telling the others, the gatekeeper selects a characteristic which gets through the gate (similar to a toll booth). Players select a block and show it to the gatekeeper only, who tells each if he/she gets through the gate. (The first try is luck.) After that the child should devise their own strategies for getting through. Once everyone has gone through the gate, the class determines what characteristic got through. Gatekeeper selects his/her replacement and the game begins anew.

7. Gatekeeper II (10 to 12 players, or less)
Two children are gatekeepers, each at a separate location. Players show their blocks to either gatekeeper and can get through either gate. Once all are through, discuss it's a "union of two sets, ________ or __________." Is there an intersection? (There may or may not be; they could be disjoint sets.)

FOLLOW-UP: Teacher can extend these concepts to numbers instead of blocks. See Attribute Games and Activities*.

SOURCE: Learning by Logic*

RELEVANCE: The principles involved in these activities require decision-making using logical deductions. This is a skill able students need to develop. Listing of attributes is a technique of creative problem solving. By first working with attribute blocks, students are prepared for a more abstract application of attribute listing for creative problem solving.

MATH - I

OBJECTIVE: To enable students to rotate a three dimensional object mentally

MOTIVATION: Discuss the importance of spatial rotation in such areas as math, drafting, art.
Present the problem of the "Top-Dotting, Clockwise-Turning Boxes". (next page)

ACTIVITY: Students work individually to complete sheet.

FOLLOW-UP: Individual students present their solutions and verbalize their strategies. Group discussion will point out the different possible ways of attacking the problem; holistically, analytically, working forward, or working from the back.

SOURCE: Lots of Things to Do on Friday Afternoons, Grade 6, Instructo/McGraw-Hill (1977) p. 2

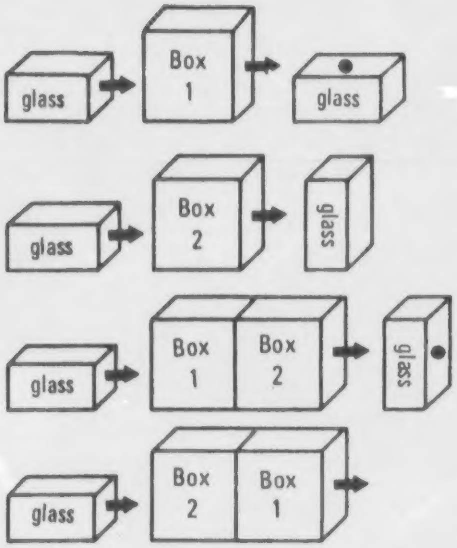
RELEVANCE: Spatial tasks are generally neglected in the traditional elementary curriculum, yet spatial abilities are required by many professions which able students might plan to enter; architecture, engineering, art.

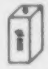
Name ______________________

*The Top-Dotting, Clockwise-Turning Boxes

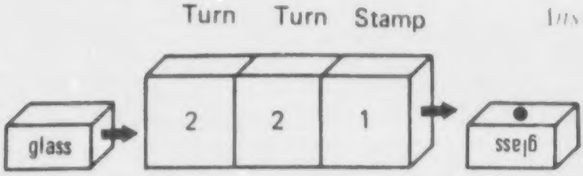
Directions:

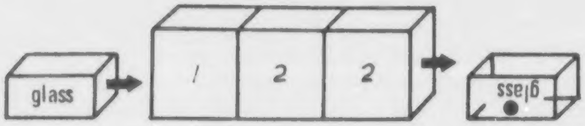
1. Look at Box 1.
2. Look at the glass box beside Box 1. It has the word **glass** written on it.
3. When the glass box goes through Box 1, *it gets a dot stamped on it.*
4. Look at Box 2.
5. When the glass box goes through Box 2, *it gets turned on its side.* (the word **glass** turned to **glass**)
6. At the right, Box 1 and 2 work together. When the glass box goes through *both* boxes, it gets stamped in Box 1, then it gets turned on its side in Box 2.
7. At the right, Boxes 1 and 2 are reversed. Box 2 is first. Box 1 is second. Draw a picture of what has happened to the **glass** box as it goes through both boxes.

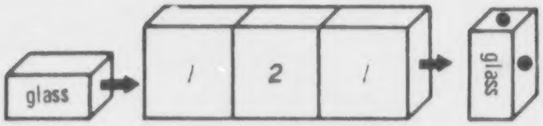

glass
Box 1
glass
glass
Box 2
glass
glass
Box 1
Box 2
glass
glass
Box 2
Box 1

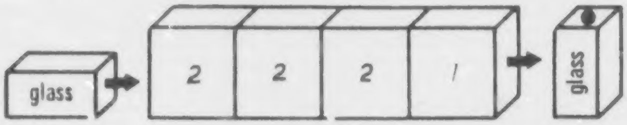
8. Did you draw this?  Box 2 turned glass box on its side, then Box 1 stamped it with a dot.
9. The boxes below are made up of Boxes 1 and 2 – in different orders. Look at the results and figure out what order the boxes are in.
10. Label each box 1 or 2 in the correct order. (The first one has been done for you.)

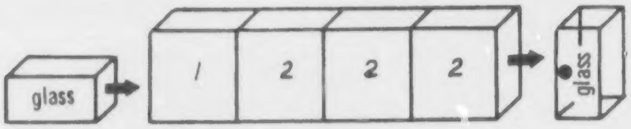
Answers are provided for your convenience


Turn
Turn
Stamp
glass
2
2
1
glass


glass
1
2
2
glass


glass
1
2
1
glass


glass
2
2
2
1
glass


glass
1
2
2
2
glass

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Lots of Things to do on Friday Afternoons,
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MATH - I

OBJECTIVE: To increase skill on spatial tasks

MOTIVATION: Make a transparency of one of the easier examples of the following materials.
Project it in the classroom and ask the students to solve it mentally.

ACTIVITY: Students perform mental manipulations on various spatial tasks from the Inductive Thinking Skills spatial materials.
Students take turns drawing completed mental manipulations on the board and describing the process used to complete the task.

FOLLOW-UP: Discuss the use of spatial skills in such subject areas as geometry. Relate it to outside activities such as working jigsaw puzzles, designing buildings, and interior decoration.
These activities (Inductive Thinking Skills) may be used frequently as a warm-up for other math-related activities.

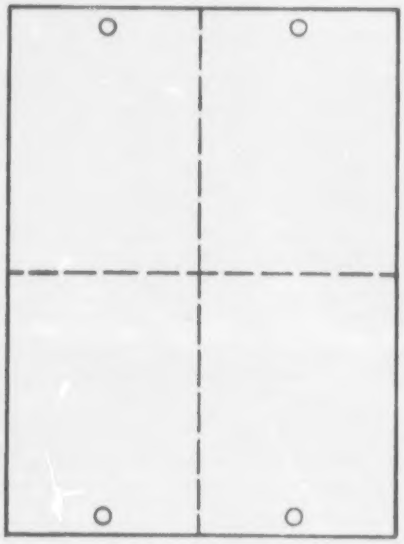
SOURCE: Inductive Thinking Skills: Spatial Perception A,* pp. 1-3.

RELEVANCE: This activity and others like it require students to deal with a non-verbal medium. Most elementary curriculum is verbal. Spatial skills have been shown to be significantly related to success in mathematics which in turn is necessary for many high level professions. Another factor is the recognition that girls are less able to deal with spatial material than boys. Thus we want to increase the opportunity for all students to develop spatial ability.

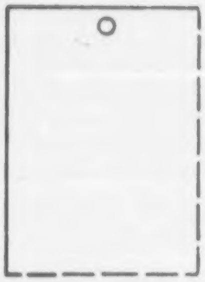
How good are you at being able to "see" things in your head? Here are two examples of some of the kinds of problems in this booklet.

Example 1

Problem: Here is a sheet of paper with four holes punched in it. It is to be folded flat along the dotted lines. How will it look after it has been folded?



Answer



(continued on next page)

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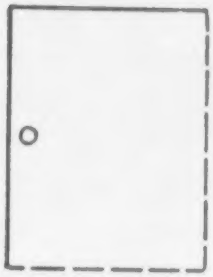
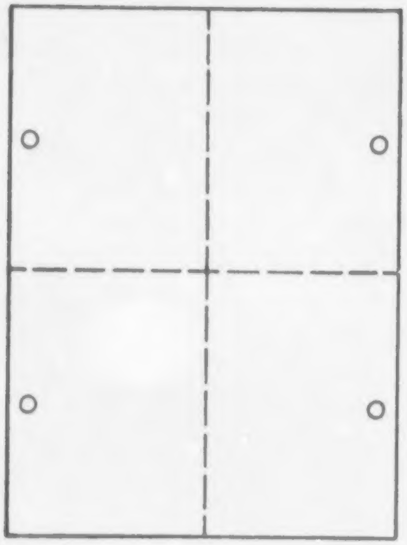
Example 2

Problem: Here is a sheet of paper already folded. A hole is shown. (The hole goes all the way through.) How will it look when it is unfolded?



Answer



Note: It is not fair to use a real sheet of paper to help solve the problems.

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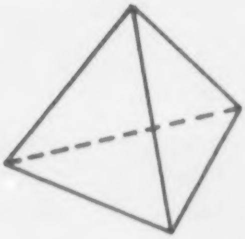
MATH - I

OBJECTIVE: To develop spatial ability

MOTIVATION: "If you could be a Christmas tree ornament, what shape would you like to be? Describe yourself. What colors are you?"



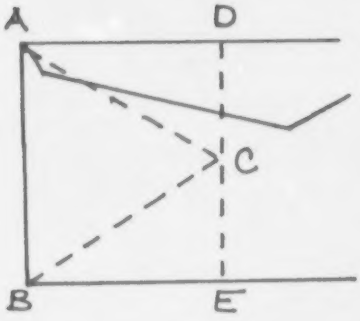
"Think of words with the beginning 'oct-'" octagon, octave, octopus, October (it used to be the eighth month), etc.

Introduce and show pictures of a tetrahedron, cube, octahedron, dodcahedron, and icosahedron.

ACTIVITY: Material needed: envelope, compass, ruler

Construct a tetrahedron from a sealed envelope.

1. Draw the dotted lines with a ruler. Place the points on the envelope and label them. Use a compass to construct point c. ABC is an equilateral triangle.
2. Cut along $\overline{DE}$, through C. $\overline{DE}$ is parallel to $\overline{AB}$.
3. Design and color the tetrahedron. The compass and ruler can be used to make the designs.
4. In both directions fold along $\overline{AC}$ and $\overline{BC}$, back and forth.
5. Mark the point C' on the reverse side corresponding to point C.
6. Pinch the envelope so that points D and E are joined. (C and C' are separated.)
7. Tape along segment CC'. Your tetrahedron is complete.



What are the number of edges of the tetrahedron? (6)
What are the number of vertices? (4)
What are the number of faces? (4)

FOLLOW-UP: Construct a cube, dodecahedron, and other geometric shapes. What are the number of edges, vertices, and faces?

SOURCE: O'Daffer, Phares G. and Clemens, Stanley R. Geometry: An Investigative Approach. Addison-Wesley Publishing Company, Menlo Park, CA, 1976, p. 124.

RELEVANCE: This activity develops spatial ability through the use of discovery learning. Able students need "learning by doing" experiences to develop the concepts of solid geometry.

OBJECTIVE: To develop spatial abilities

MOTIVATION: Define clockwise and counterclockwise turns, 90 degree and 180 degree turns.

Show pictures of turns. For example, use source below to show a picture of a rabbit. Turn this picture 90 degrees counterclockwise. "What do you see?" A ride on a ferris wheel is an example of the turn motion. Skiing is a slide motion. The slide projector is a useful example of the flip motion.

ACTIVITY: "Create your own drawings of turns."

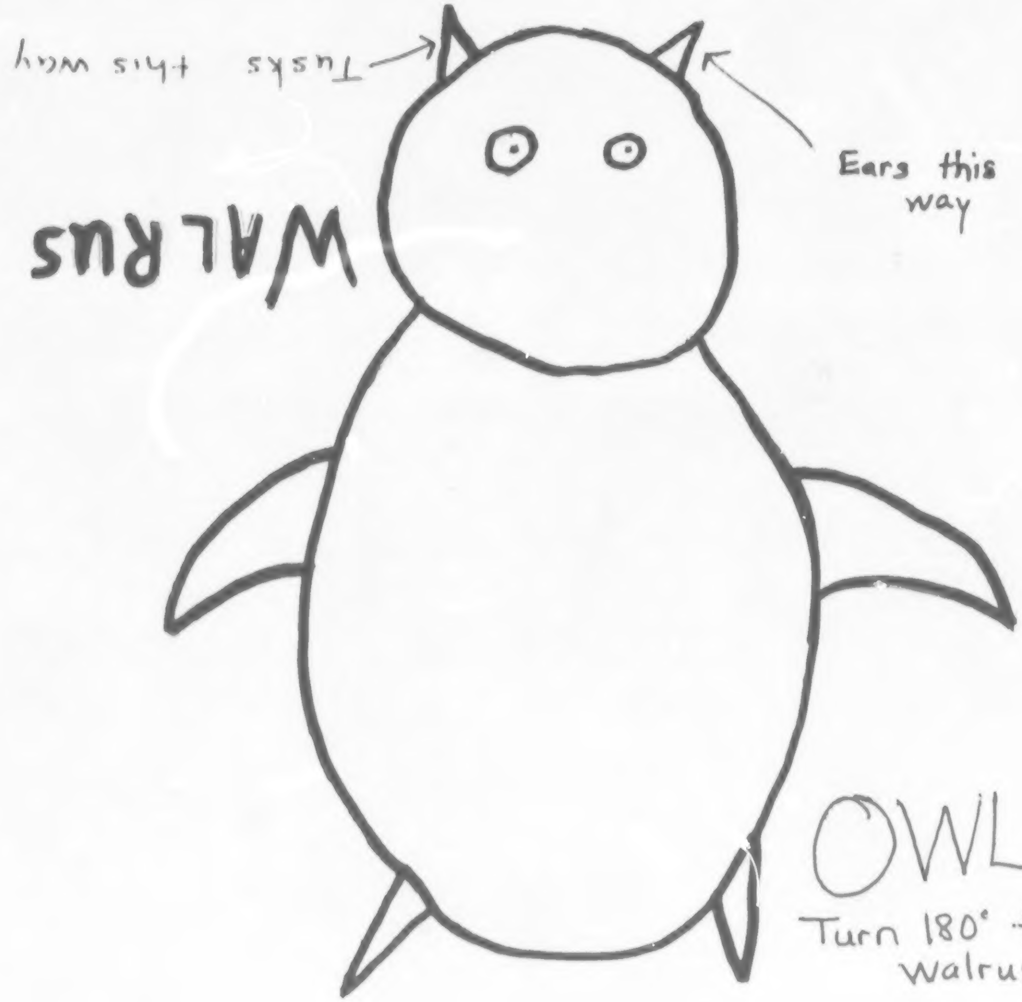
FOLLOW-UP: Explore slides, turns, and flips. For example, use a mirror. "Which letters of the alphabet are mirror images in line p of themselves?" (Page 184 of the following source: A, H, I, M, O, T, U, V, W, X, Y)

A↕

Mathematics is useful in describing and analyzing motion. Mathematics of motion is an appropriate topic of study for students at various levels.

SOURCE: O'Daffer, Phares G. and Clemens, Stanley R. Geometry: An Investigative Approach, Menlo Park, CA: Addison-Wesley Publishing Company, 1976, pp. 156, 169, 181, and 184.

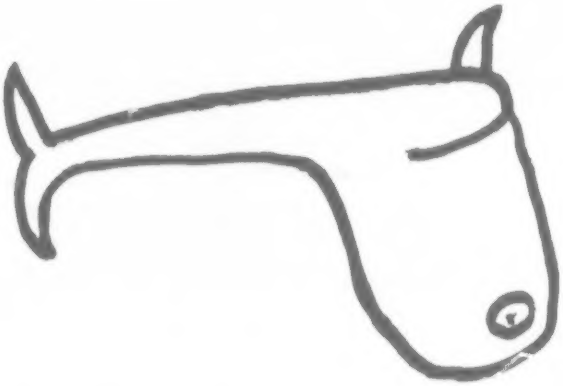
RELEVANCE: This activity encourages able students to develop figural creativity and spatial abilities.


Tusks this way
WALRUS
Ears this way

OWL

Turn 180° to get a walrus

Charlie F. Grade 6



This is a gun. Turn it upside down (180°) to see a sea monster.

Tom B.
Grade 6

MATH - I

OBJECTIVES: To provide an opportunity for concrete manipulation and construction of geometric shapes
To encourage spatial reorganization skills

MOTIVATION: "We are going to play 'Pentominoes.' A pentomino is any shape constructed of five squares. Each square must have at least one side in common with one other square. There are 12 possible pentomino shapes." (See next page.)

ACTIVITY: To play pentominoes, you need:

1. chessboard or checkerboard
2. approximately 60 small squares of paper, half of one color, half of another color
3. two players

Rules

1. Each player takes turns putting a pentomino shape on the board.
2. Each shape may be used only once.
3. A player wins when his/her opponent can not put a shape on the board, or when his opponent has put a rotated shape on the board.

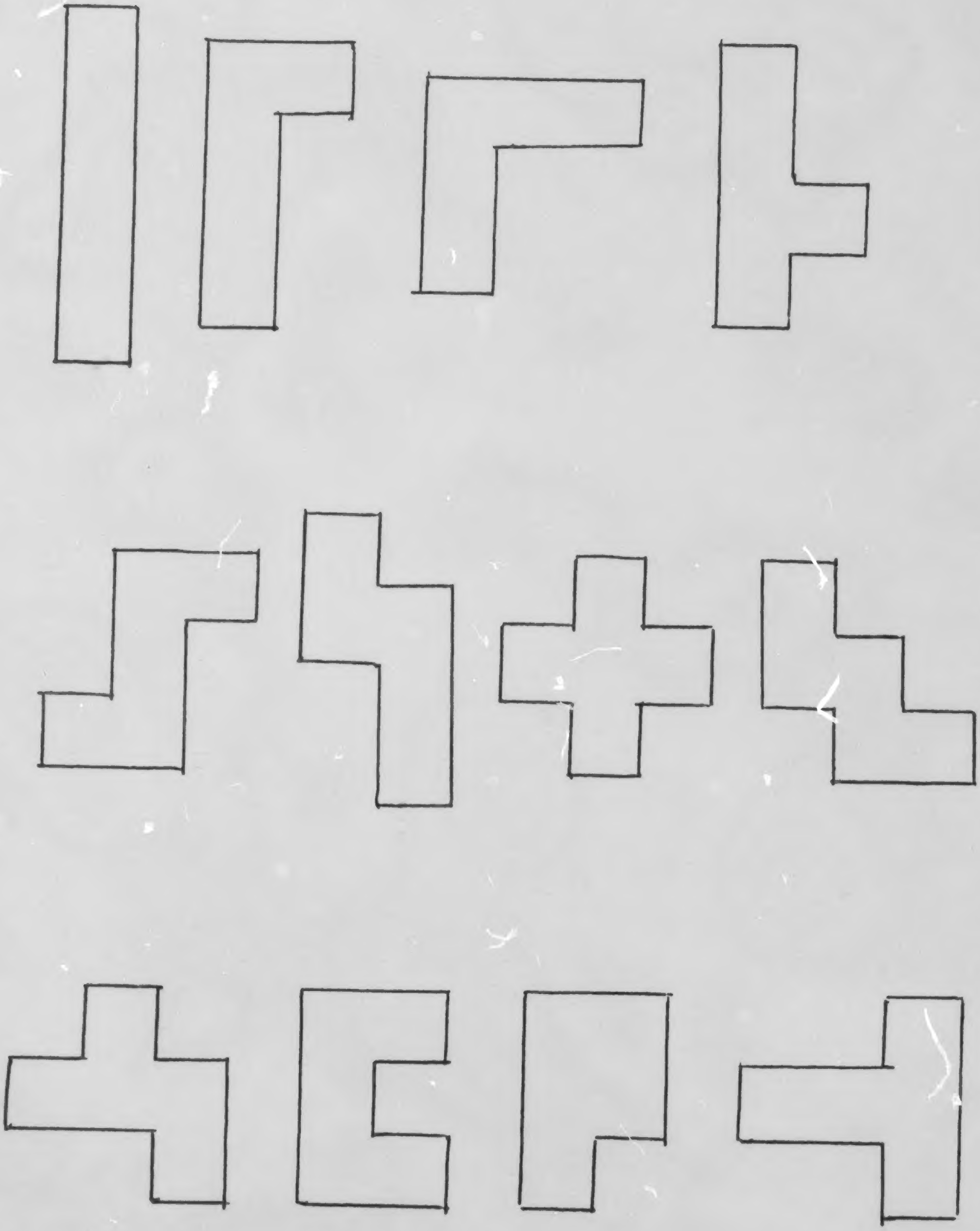
FOLLOW-UP: After students are familiar with pentominoes, try this variation. Each student has 60 squares and tries to build the 12 pentomino shapes faster than any other player. (This helps them to identify rotated shapes quickly.)

SOURCE: O'Daffer, Phares G., and Clemens, Stanley R. Geometry; An Investigative Approach, Menlo Park, CA: Addison-Wesley Publishing Company 1976, pp. 46-89.

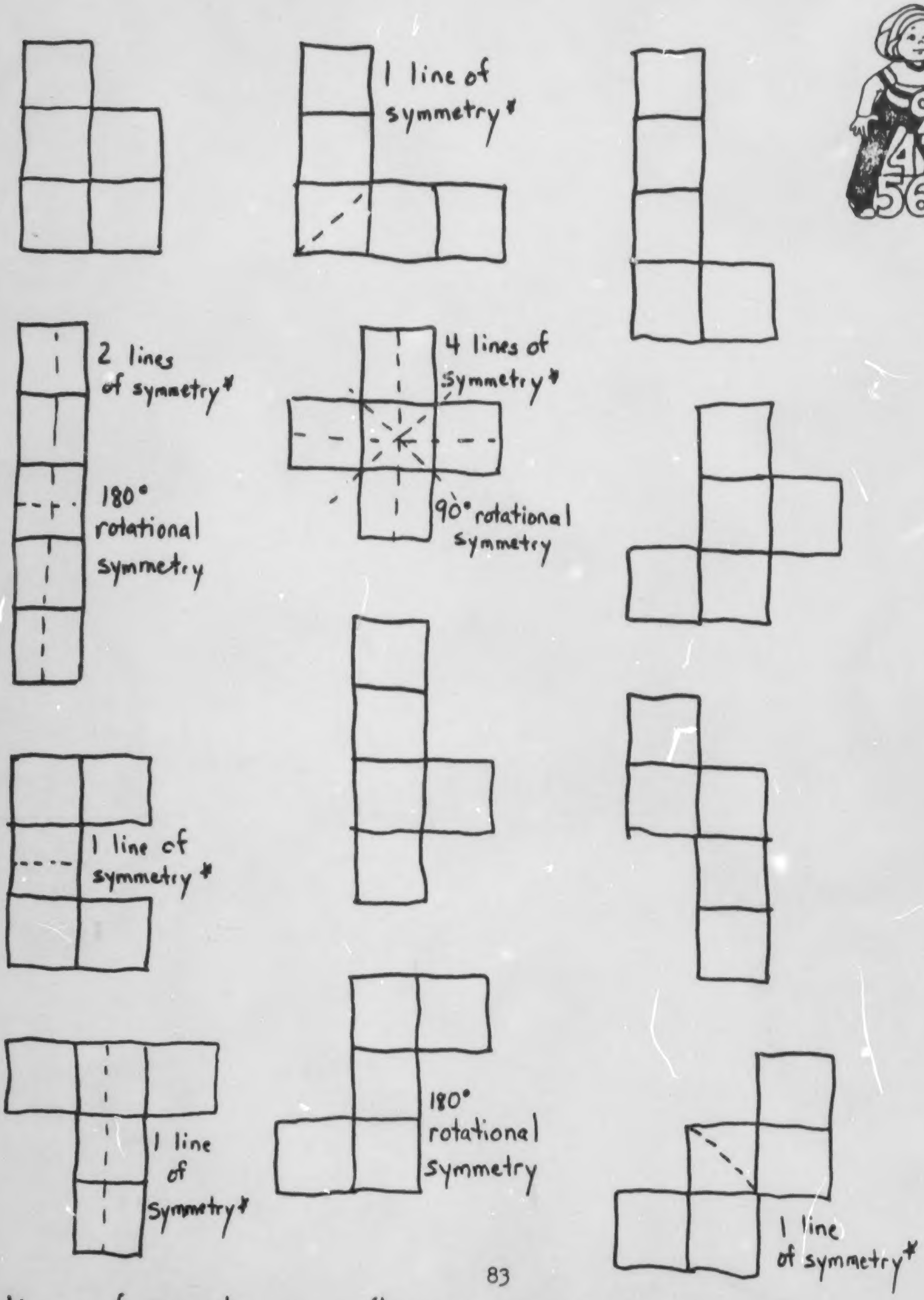
RELEVANCE: Able students need manipulative activities with shapes which translate abstract concepts in geometry to understandable ideas.

OBJECTIVE:	To develop spatial abilities
MOTIVATION:	Define pentomino - a pentomino is a polygon made from five connected squares. Each square can touch another only on a complete side. Challenge students to find the twelve pentominoes which can be made from the five squares.
ACTIVITY:	Students cut out five squares (about 1 ½" is best). Find the twelve pentominoes and draw them. Determine which pentominoes have 90° rotational symmetry about some point. Which have 180° rotational symmetry? Which pentominoes have exactly one line of reflectional symmetry? Which pentominoes have more than one line of reflectional symmetry? Mirrors, protractors, and tracing paper are helpful for this activity.
FOLLOW-UP:	Discuss tessellation. Show how the pentominoes will tessellate the plane. Experiment with activities of tessellation, hexominoes, and tetrominoes.
SOURCE:	O'Daffer, Phares G., and Clemens, Stanley R. Geometry: An Investigative Approach, Menlo Park, CA: Addison-Wesley Publishing Company 1976, pp. 46-89.
RELEVANCE:	Able students have the ability to see spatial relationships. Able students need manipulative activities with shapes which translate abstract concepts in geometry to understandable ideas.

PENTOMINOES



12 Pentominoes   Stacy S. Grade 6


1 line of symmetry*
2 lines of symmetry*
180° rotational symmetry
4 lines of symmetry*
90° rotational symmetry
1 line of symmetry*
1 line of symmetry*
180° rotational symmetry
1 line of symmetry*

* lines of symmetry are reflectional symmetry

MATH - II

OBJECTIVES:

To introduce geometric concepts
To develop spatial ability
To introduce tangrams

MOTIVATION:

Discuss the history of the tangram (Chinese puzzle consisting of seven pieces - five triangles, a square, and a parallelogram).

Students cut their own tangrams out of oak tag or heavy paper.

Using tangrams, introduce geometric concepts as appropriate to the age and experience of the students.

ACTIVITY:

Introduce the following terms as needed: isosceles, congruent, equilateral, area, perimeter, and other terms as needed.

Have students create their own puzzles to share with others.

Discuss the various ways individual students approach problem solving with spatial materials. They will find that many reach the same solution using different reasoning.

FOLLOW-UP:

A number of materials contain activities with spatial content. Students should be encouraged to explore a variety of these activities, analyzing their strategies for problem solving. This may lead to investigation of the relationship between handedness, hemispheric functioning, and approaches to problem solving.

SOURCE:

TangramMath,* Figure Relations A and B,* Spatial Perception A and B*

RELEVANCE:

Able students need opportunities to develop their spatial abilities as well as their verbal skills. Activities such as these allow students to systematically develop these abilities.

MATH - I
SCIENCE

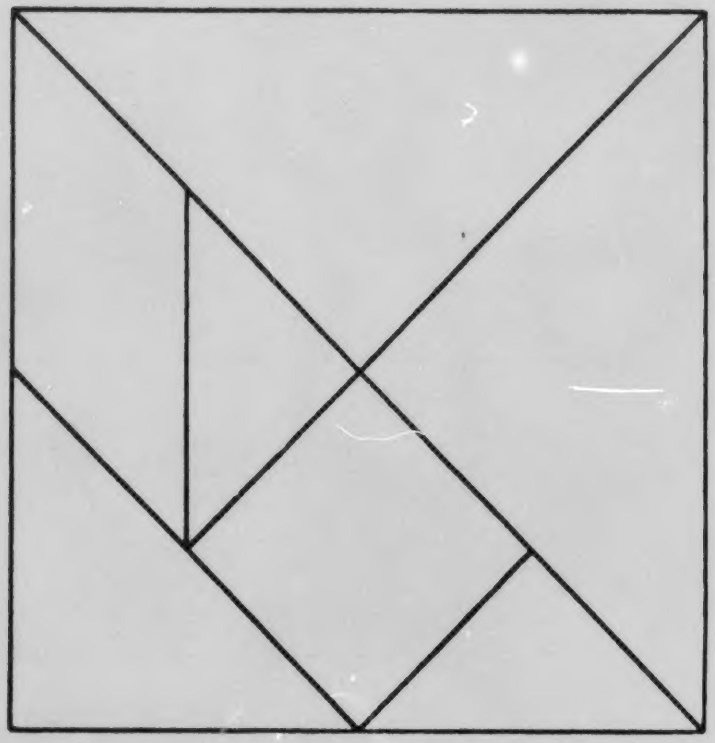
OBJECTIVES: To develop spatial abilities
To involve students in exploration, convergent problem solving, and flexibility

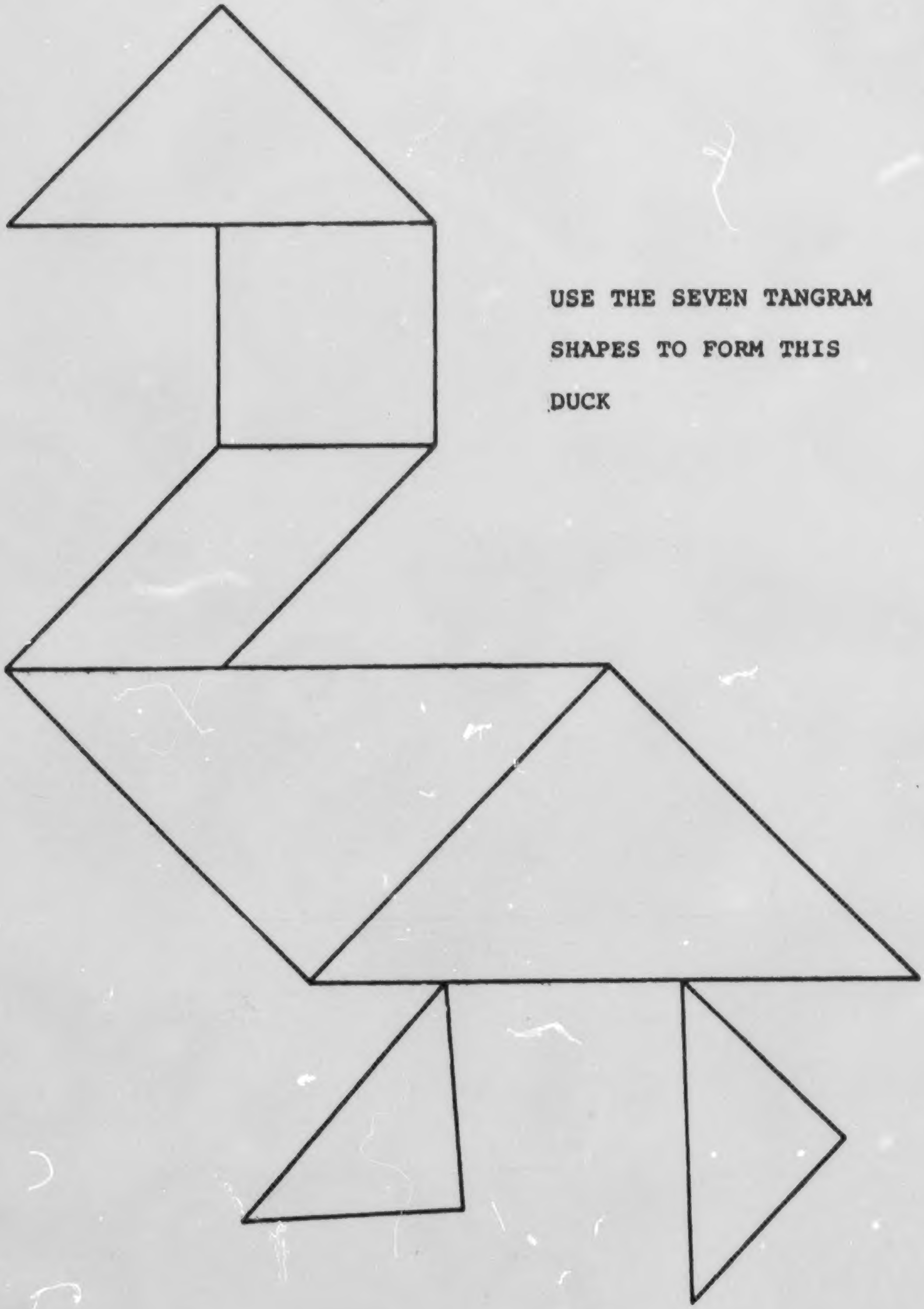
MOTIVATION: A tangram is a Chinese puzzle consisting of two large congruent triangles, one middle sized triangle, two small congruent triangles, one square, and one parallelogram.
The challenge is to place all seven pieces together to form given shapes.

ACTIVITY: Students can cut their own tangrams from the printed directions.
Students may form the shapes suggested and then make up their own shapes to be formed from tangrams by other students.

SOURCE: Tangramath*

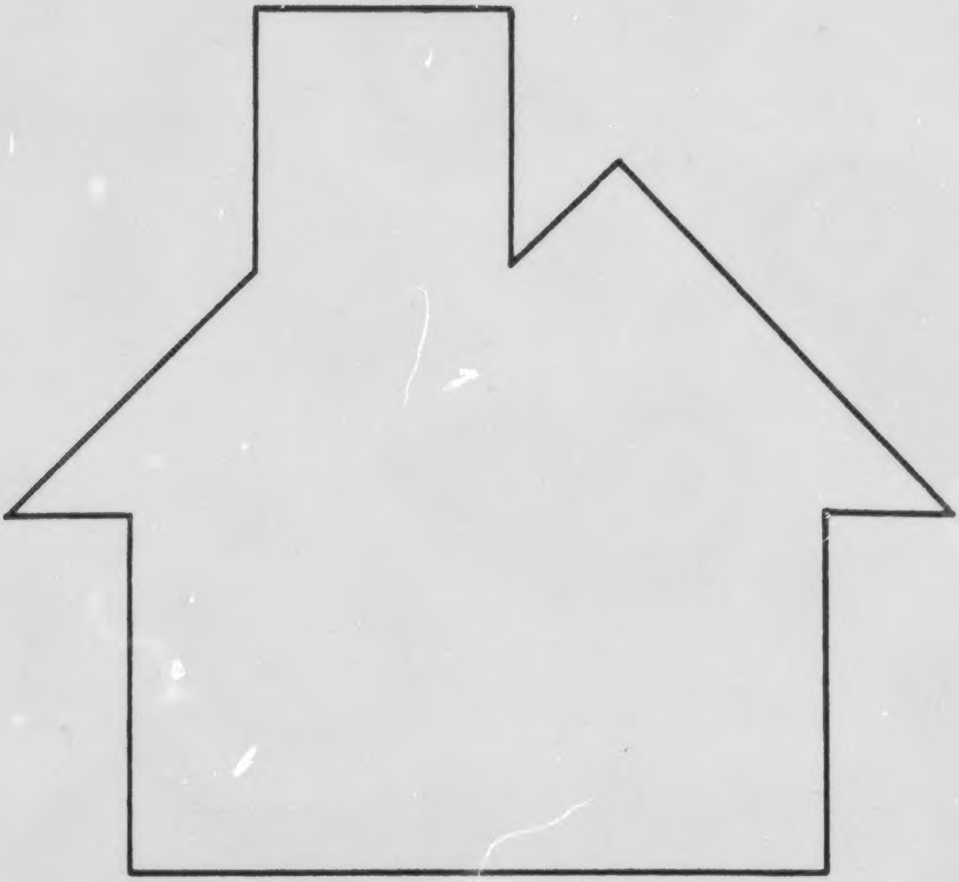
RELEVANCE: Tangrams provide able students with challenging problems which require analytical thinking, spatial skills, and figural creativity.

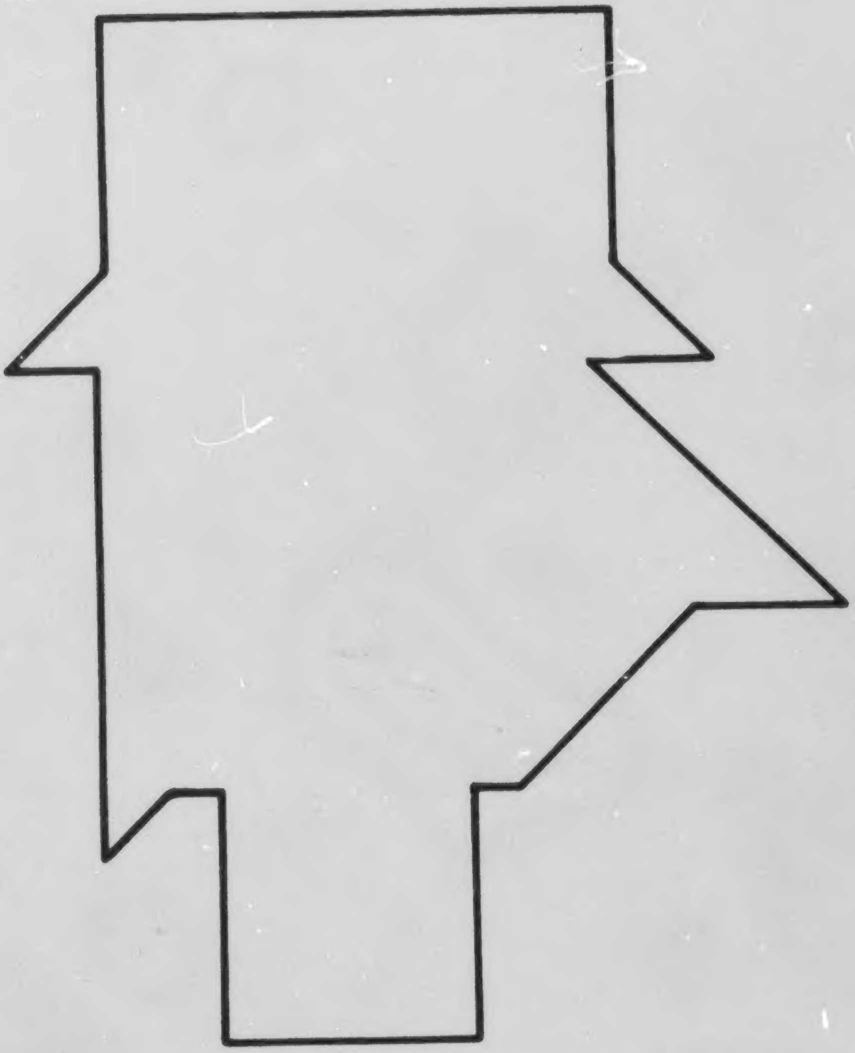




USE THE SEVEN TANGRAM SHAPES TO FORM THIS DUCK

USE THE SEVEN TANGRAM SHAPES TO FORM THIS HOUSE





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MATH - I, II
SCIENCE - II

OBJECTIVES:

To provide practice in measurement, estimating and averaging
To practice mathematical computation
To teach (or review) the concepts of area and perimeter
To teach (or review) geometric shapes
To teach a method for making a scale drawing

MOTIVATION:

"We will visit a cemetery. There are certain things you'll need to do while there." Distribute and discuss the Cemetery Visit page (see page 92), so the students will have specific objectives for their visit and will understand what they are to do. They will be collecting data for the next sessions. Divide the class into measurement teams, no more than 4 persons per team, to assure involvement by everyone. (Note: you may want to include other things on the Cemetery Visit page to relate the trip to language arts, social studies, etc.)

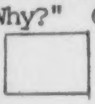
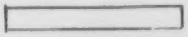
ACTIVITIES:

I. Go to a cemetery. Students need to take pencils and rulers or small tape measures. Take one or more 100' tapes. Be sure that all measurement teams take the required measurements.

II. There are many possible math- and science-related activities. Teacher must determine which of these to teach and adapt the Cemetery Visit sheet accordingly. Listed below are several possibilities:

A. Measurement
Get reports from each team on length and width of cemetery or a designated area within, and height of fence. (Figures will differ.) Discuss what to do about this. Decide whether to use the mean (average) or the median (middle figure from lowest to highest) measurement. Using these figures:

1. "We need a new fence. How many feet of fencing do we need?" Let students find the perimeter and tell how they found it; then provide the usual formula before they work the problem.
2. Find the area of the cemetery.
3. "Rootworms ate the ground bare. If 1 lb. of grass seed covers 300 sq. feet of bare ground, how much grass seed should we buy?"
4. "What were the tallest and shortest tombstones?"

5. "Which tombstones covered the most surface area? Why?" Compare various answers:  to . Encourage students to make statements about length and width relative to area.

B. Computation
   1. Discuss section B on Cemetery Visit sheet.
   2. Create problems to be computed for activities A.1. and A.3. above. "Fencing costs.........." etc.

C. Geometric Shapes
   Discuss section C on Cemetery Visit sheet. Be sure students understand the terminology.

D. Scale Drawing
   Use agreed upon measurements from activity A above. "How can we draw to scale a map of the cemetery on 8½ x 11" graph paper?" Discuss how to determine the scale. Then draw the map to scale. Add a key, including important information.

FOLLOW-UP: Teacher may discover conceptual and/or computational skill gaps during the above activities. Provide additional activities as needed or desired.

SOURCE: The Cemetery Box by Don Mitchell and Gary Grimm. Good Apple, Inc., Carthage, IL 62321, 1975.

Barbara Ilgen, PACE teacher

RELEVANCE: Able students usually have a history of success with math book instruction. Yet they need the practice of applying these concepts and skills to practical problems. For example, the students may be unaccustomed to figuring area when it is not one of a series of problems from the text. Of course, true understanding of a concept requires that they be able to apply it whenever they encounter it. These cemetery activities provide a unique opportunity for teaching, reviewing, or re-teaching important concepts.

CEMETERY VISIT ____________NAME

A. Measurement Team #____ length______ width___________

height of fence______________

With your ruler or tape measure find:

tallest tombstone __________ ____________________
(height) (name)

shortest tombstone _________ ____________________
(height) (name)

tombstone that covers largest surface area

length __________ width____________

B Look at tombstones to find:

earliest birthdate______________ _________________
(date) (name)

person who lived the longest __________ ____________
(how long) (name)

oldest gravestone ______________ ___________________
(date) (name)

most recent burial ____________ ____________________
(date) (name)

person who lived more than a century

________________ ______________
(dates) (name)

gravestone for someone who lived more than 8 decades

___________________ ______________
(dates) (name)

someone who outlived his wife __________ ___________________
(name) (by how many years)

C. Cemetery Shapes

Can you find something round, square, rectangular?

Can you find something shaped like a cone, cylinder, pyramid, sphere, ellipse, prism, hemisphere?

MATH - I

OBJECTIVES: To introduce (or review) the concepts of prime numbers, composite numbers, and exponents
To provide practice in factoring, addition, multiplication and division

MOTIVATION: "Numbers can tell a lot about you. Let's find out what words describe you."

Use this lesson in either of two ways; first it can be used to culminate the study of prime and composite numbers. Secondly, it can be used to introduce these concepts. If it is the introduction of these concepts, a day of preparation will be necessary in which students will learn to generate a list of primes up to 50 (or 100) and learn to factor composite numbers. The next day they will be ready for the Prime Number Game.

ACTIVITY: The teacher lists all children's names on the board and gives each a code number, starting at 1 and numbering until each child has a code number.

The children brainstorm words which describe people. (The teacher has the right to censor the words suggested by saying, "Only neutral or complimentary words are acceptable.")

Then list prime numbers up to 50 (or 100), one beside each descriptive term.

"Now we can start. Someone calls out a two-digit (or three-digit or more) number. Everyone adds the digits and the person stands whose code number is the sum of those digits." (e.g., Someone says 76. Person with code number 13 stands.) "That person factors the number called (76) into its prime numbers (2x2x19)."

"Then look at the descriptive words beside the primes 2 and 19." For example, let's say they are 2 - intelligent and 19 - patient. "Since there are two 2's, the person is 'very intelligent and patient.'"

$76 = 2 \times 2 \times 19$
Sue is very intelligent and patient.

Another child calls out a new number and the game starts over. Continue playing until all children have been described.

This game must move rapidly to avoid boredom. Encourage all children to think with the player who is factoring.

FOLLOW-UP: When a number repeats itself as a factor (2x2x19), introduce (or review) the idea of exponents. "2x2 can be written as 2^2." Factor 16 as an example, (2^4)

SOURCE: Atkins, Maxine. A Collection of Ideas and Mathematical Concepts for Gifted Elementary School Children. Champaign, Il, 1966.

RELEVANCE: Able children grasp new ideas quickly and are able to switch from addition to factoring as needed.

OBJECTIVE: To enable students to develop strategies for mathematical problem solving

MOTIVATION: Present the following problem to the students:

"A farmer buys 100 animals for $100. Cows are $10 each, sheep are $3.00 each, and pigs are 50 cents each. How many of each animal did the farmer buy?"

ACTIVITY: Students are encouraged to try different ways of solving this problem. Some of them will begin with a guessing strategy. Others may draw the problem in order to visualize the facts. Working in pairs or small groups may help to determine the solution.

FOLLOW-UP: A number of teachers have motivated able students by telling them that this problem, and others like it are usually done by high school students. There are a number of problems of this nature in many of the materials for able students. They are excellent as warm-ups, learning center challenges, or take home activities.

SOURCE: Fixx, James. More Games for the Superintelligent * (Don't be put off by the title. This is a great source of activities, mostly Stage I, which have varying degrees of difficulty.)

This book is widely available in paperback: Popular Library, 1977, $1.75.

RELEVANCE: This type of problem is very challenging for many students and may lead them to explore higher level mathematics.

Answer: $C + S + P = 100$
$10C + 3S + .5P = 100$

Trial and error is necessary for arriving at a solution since there are two equations and three variables. The easiest way to begin is to try different values for C. 5 Cows, 1 Sheep, and 94 Pigs is the correct solution.

MATH - II

OBJECTIVES:

To develop strategies for mathematical problem solving
To encourage a variety of approaches to problem solving

MOTIVATION:

Present the following problem to individuals in the group. Allow time for students to try a variety of strategies for arriving at the solution.

"Joan recently went to a charity bazaar. Although she had not intended to buy anything, all her money was spent by the end of the day. At tent #7, she paid one dollar to enter and then spent one half of what she had left for an antique clock. She then paid two dollars to get into tent #2. Here she spent half of what she had left for a picture. At tent #3, she paid two dollars to get in and spent half of her remaining funds for a brass kettle. Tent #4 cost two dollars to enter. Here she spent half of what she had left for a picture frame and then, having only one dollar left, she put that into the charity box. How much money did Joan take with her and how much did she spend for each item?"

ACTIVITY:

Students are encouraged to try different ways to solve the problem. Some will begin with a guessing strategy, others may try to solve the problem starting at the end and working backward. Some may attempt an algebraic solution. All of these methods should be encouraged. After individuals have attempted the problem, students may wish to work in small groups.

FOLLOW-UP:

This and similar problems are good warm-up activities, learning center challenges, and take-home activities.

SOURCE:

Thinklab 2* Card # 130

RELEVANCE:

This type of problem, requiring a logical approach, is challenging for many able students and may lead them to explore higher level mathematics.

solution:

She began with $45.00.
The clock cost $22.00.
The picture cost $10.00.
The kettle cost $4.00.
The frame cost $1.00.

The problem is easier to solve if you work backward.

SCIENCE

OBJECTIVE: To strengthen question-asking skills

MOTIVATION: Present the problem: "Imagine that a friend has offered to give you a panda for a pet. You must decide if a panda would make a good pet for you and your family. Think of at least six questions you would ask about a panda."

ACTIVITY: Students write their questions. Teacher may answer a few of the questions if he/she wishes. Students must decide how to find answers to their questions. As they find the answers, new questions may evolve.

FOLLOW-UP: Using information from questions and answers, design a place for the panda to live in your own home.

SOURCE: Think Big*, p. 47

RELEVANCE: Able students need activities to sharpen question asking and inquiry skills. These skills are vital to problem solving and independent study.

OBJECTIVE:	To encourage problem solving by analyzing a problem into its components
MOTIVATION:	Discuss what analysis means and how it helps to break a problem into parts. "Imagine your school is sponsoring a science fair. What committees would be necessary for a successful fair?"
ACTIVITY:	Complete worksheet.
FOLLOW-UP:	Compare their "energy chains" to see how many different chains or analyses are developed.
SOURCE:	The Universal Traveler by D. Koberg and J. Bagnale, Los Altos, CA: William Kaufmann, Inc., One First Street, Los Altos, CA 94022, p. 50.
RELEVANCE:	A characteristic of able students is that they can see relationships drawing upon knowledge from many other sources. This activity requires students to use knowledge of basic science concepts in order to formulate relationships.

From The Universal Traveler, p. 50:
"Creative Problem Solving Method for analysis: BACK-TO-THE-SUN

Since all physical things are reducible to primary energy sources, you can analyze things by tracing their "history" of processing back to their natural resource states and ultimately to the sun as the source of all energy. This method can become a game of trying to find the largest list of "historical" points in the process.

EXAMPLE:
Look at your shoe. What do you see?
I see leather, rubber, strings, nails, grommets, polish, thread, etc. And for each of these, I can trace a process back to natural resources and the sun.

Rubber	Strings	Leather	Polish
stamps			
mold			
heel factory			
shipping			
raw latex			
processing			
rubber plant			
rubber tree			
sun			

Nails	Grommets	Thread

FOR WHAT KINDS OF PROBLEMS WOULD THE BACK-TO-THE-SUN METHOD BE MOST USEFUL?"

SCIENCE - II
CREATIVE PROBLEM SOLVING

OBJECTIVES: To promote group problem solving
To provide experience using bionics as a technique for problem solving

MOTIVATION: Bionics is a technique for problem solving which looks to nature to observe ways in which things in nature function. For example, many insects and animals rely on the coloration of their bodies to protect them from predators. From this example in nature, the military developed camouflage, the technique of designing uniforms and painting equipment to blend in with the surroundings.

ACTIVITY: In small groups, 3 - 4 students, brainstorm a problem which may be solved by bionics. Present this to the other groups.
Some examples of nature which may be applied to problems:

RADAR in bats
SONAR in dolphins
The lens in the human eye
The quills of a porcupine

FOLLOW-UP: This technique may become a standard approach to try in problem solving situations.
There are activities using Bionics in Creative Growth Games* and Design Yourself*.

SOURCE: The Universal Traveler by D. Koberg and Jim Bagnall
Los Altos, CA: William Kaufmann, INC. One First Street Los Altos, CA 94022 $5.45, p. 87.

RELEVANCE: Bionics is an extension of the ability to see relationships and a component of problem solving situations. Able students need opportunities for problem solving strategies.

BIONICS

Bionics, the science of interrelating natural and man-made systems, is still another variation of a problem solving approach. For every idea some natural counterpart can be found. By studying how the natural model works, and how it survives and achieves its ends, your idea will find its guidelines.

1. Using bionics, solve the problem of a zipper for a spacesuit.
   Remember one of your problems will be that you have no gravity to aid you.

2. Using bionics, solve an energy problem. How can we make the roof of a house more energy efficient?

SCIENCE - II
SOCIAL STUDIES
SELF-CONCEPT

OBJECTIVES:	To involve divergent thinking, originality, and flexibility To provide an opportunity for each student to contribute unique ideas
MOTIVATION:	Students close their eyes and think about being an automobile while teacher reads the introduction. (see next page)
ACTIVITY:	Students become automobiles in their imaginations. They respond, as though they are automobiles, to the questions. (see next page)
FOLLOW-UP:	Imagine what life was like before the invention of the horseless carriage. What do you feel were the reactions of the people who saw the horseless carriage for the first time? Dramatize these reactions.
SOURCE:	Janice Gudeman, PACE teacher
RELEVANCE:	This activity sparks creativity and positive feelings.

AUTOMOBILE ENCOUNTER LESSON

Introduction:

Imagine snow-peaked mountains touching the clouds in the distance, sunshine reflecting on a crystal-clear lake, wild flowers swaying in the breeze, and a fawn curiously peeking around a tree in the forest. You are to become an automobile traveling on the road winding around the curves on the mountain.

Questions:

1. What kind of automobile are you?
2. What color are you?
3. How fast are you traveling?
4. Where is your destination?
5. You just passed someone who took a second look at you. What are you most proud of? What do you consider as your most outstanding feature?
6. You just stopped for a train at a railroad crossing. You heard a plane roaring above and saw a sailboat serenely sailing in the lake. What do you think are the most interesting features about these different forms of transportation?
7. Skidding to a sudden halt to avoid a collision, you just missed plunging off a steep cliff. How do you feel, and what did you almost hit?
8. A truck driver has just asked your driver to drag race on the winding road to see who reaches the top of the mountain first. Your driver agrees. How do you feel about this?
9. It just rained. It is turning colder, and has started to snow. Now it is time for the long journey down the mountain. What will this do to you as you travel down the mountain, and how do you feel about it?
10. If you could change anything about the automobile, what would you change?

OBJECTIVES: To give students experience making choices and planning activities

MOTIVATION: Discuss situations and occupations in which planning is important (teaching, medicine, television, etc.).

What aids do people use to help in planning? (calendars, plan books, date books).

Ask students who plans their days for them. How much time do they plan for on their own? Have students discuss what they would do if they could plan their time for one day.

ACTIVITY: In order to appreciate the requirements of good planning, each student plans a day of his/her own choice. It may be helpful to give each student a chart broken down into time periods.

FOLLOW-UP: Students share their ideal plan.

Discuss: "Was planning easy? What determines the differences in individual plans? Do all people plan the same kinds of activities? How does a person's career affect the plans they must make?"

SOURCE: Future Think *

RELEVANCE: During independent study, students will be responsible for planning their own time and research. This awareness at an earlier state of their program may make subsequent planning easier.

SCIENCE - II

OBJECTIVES: To develop question-asking skills
To provide practice for interviewing techniques

MOTIVATION: "What is an extraterrestrial?" (define)
"If you were to meet one, what would you ask him or her? What would you want to learn about someone from another planet?"

ACTIVITY: "List 10 questions you would like to ask an extraterrestrial."

After questions are formulated, students select a partner who assumes the role of the extraterrestrial. Questions are then posed to the partner in an interview format. The extraterrestrial answers the questions, creating "on-the-spot" responses.

The two reverse roles and repeat the process.

FOLLOW-UP: The interviews may take place "live" or may be videotaped so that others may view them.

An evaluation of the activity should be conducted by the participants. One point to stress is the type of questions which are included in the interview. At this time it may be necessary to point out the undesirability of asking questions which can be answered simply "yes" or "no" or those which elicit little information.

Students may be encouraged to watch and evaluate televised interviews such as those conducted by Barbara Walters, Tom Brokaw, or other professionals.

SOURCE: *Tomorrowise**

RELEVANCE: Able students need experience generating relevant questions. This type of activity focuses on skills which will be important in independent study and research.

OBJECTIVES:	To provide opportunities for analysis and synthesis
MOTIVATION:	"What does our planet have that others do not?" List the attributes of earth. Elicit attributes of other planets and list those on the board. Group discussion follows. "If you were going to create a new planet, which of the planets would you use as a model?"
ACTIVITY:	"Create a new planet. Name it. Describe the following aspects of your new planet: geography, topography, physical features, atmosphere, climate, animal life, people, plant life. Compile an atlas of your planet, complete with illustrations."
FOLLOW-UP:	Share the atlases with the group. Observe differences and similarities among them.
SOURCE:	Tomorrowise*
RELEVANCE:	Students do not always have the opportunity to go beyond studying the features of their own planet. This activity requires the higher level thinking skill of synthesis - putting together a new planet by relating what they have learned about their own and other planets, but offering a chance to create out of this knowledge an entirely new planet.

OBJECTIVES: To provide opportunities for direct application of creative problem solving strategies

MOTIVATION: "What are some of the tasks that have to be done around the house?" (List)

"Which of these tasks do you and most of your family dislike?"
(Discuss these and elicit the reasons for the dislike).

"Which of these tasks could be performed by a robot?" (Discuss)

"What sorts of things would you not allow the robot to do?"

ACTIVITY: Design a robot to fit your needs.

Describe how it works, what energy source powers it, and what tasks it performs.

FOLLOW-UP: Students share robot designs with others in the group.

Discuss how a robot in the family would change life as we know it.

SOURCE: Future Think *

RELEVANCE: Application, analysis, and synthesis are higher level thinking skills which are appropriate for able students. Planning a practical application of a concept (the robot) is an opportunity for developing these skills.

SCIENCE - II

OBJECTIVES: To help students envision future needs
To give students an opportunity to project a future lifestyle

MOTIVATION: Discuss the following questions:

"What makes an old house different from a new one?"

"What is 'modern' to us?"

"What are some of the things we need in a home now?"

"What do you think you will need when you are old enough to own a home?"

ACTIVITY: After compiling a list of future home needs, students design homes of the future. Included in the designs/descriptions should be the location of the home, a list of the energy needs, a description of the energy source(s) for the home, and a list of the necessary and desirable appliances and conveniences for the future home.

FOLLOW-UP: Students may construct models of their future homes.

SOURCE: National Science Teacher's Association mini-course "Energy for Tomorrow".

RELEVANCE: Able students need opportunities to project and forecast future trends and developments.

SCIENCE - II

OBJECTIVES: To extrapolate from current transportation methods in order to design transportation for the future

MOTIVATION: List as many current modes of transportation as possible in a five minute period.

Categorize these methods.

List attributes of one category (such as passenger cars).

Predict future needs in transportation - roads, speed, fuel, cost, etc.

ACTIVITY: Students design a mode of transportation which might operate in the future. Add details and a description of the method of operation, cost, and marketing scheme for television and magazine advertising.

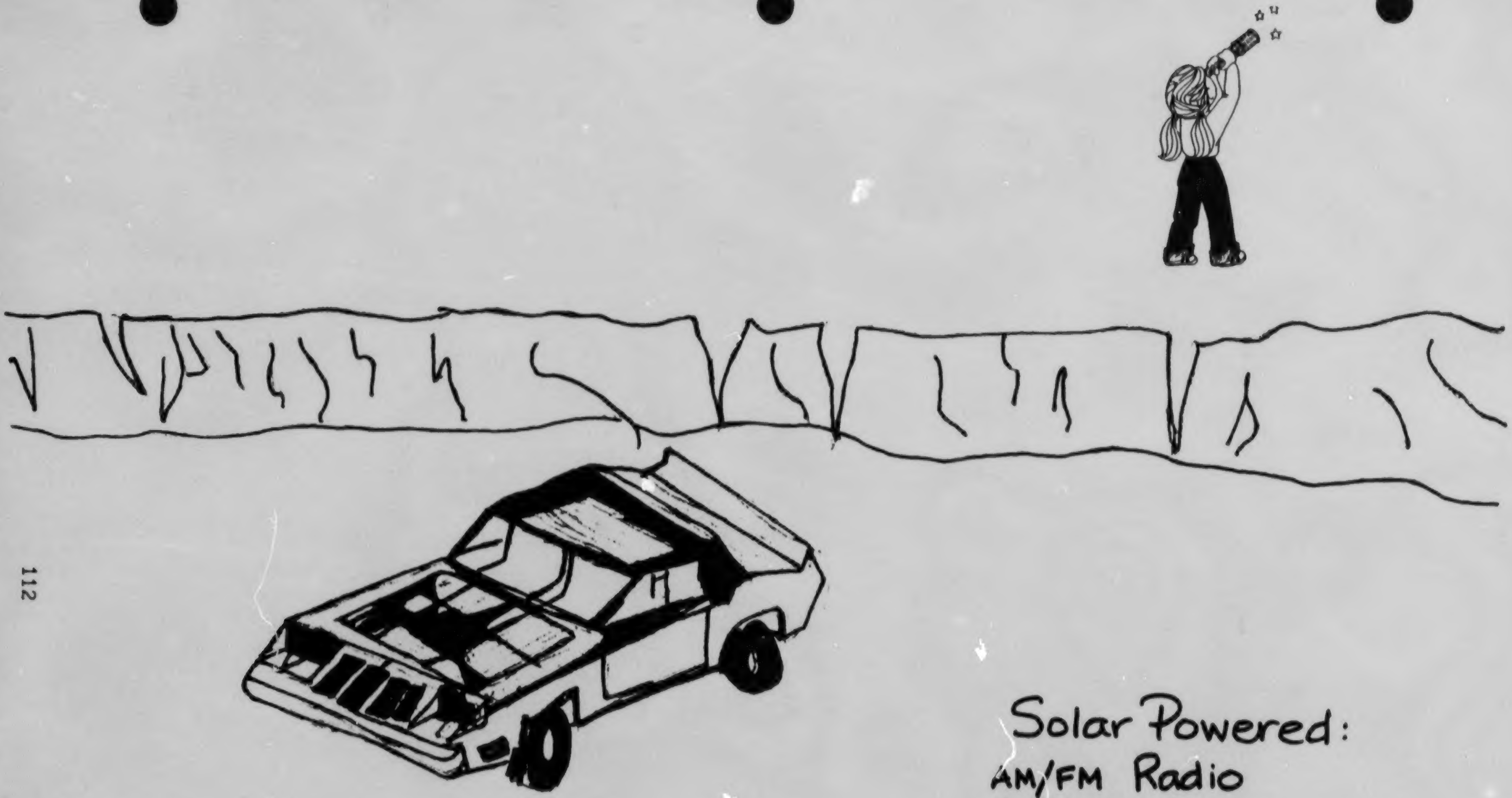
FOLLOW-UP: Students share their advertisements and products with the group. Differences and similarities can be discussed.

SOURCE: Tomorrowise*

RELEVANCE: Able students need activities of this type to encourage a "future mind set". This activity develops higher level thinking skills by requiring students to extrapolate and to synthesize.

SCIENCE - II
SOCIAL STUDIES

OBJECTIVES:	To develop forecasting skills To increase elaboration skills
MOTIVATION:	"You are driving an automobile of the future. What is it like?"
ACTIVITY:	Students draw their version of the automobile of the future. "In the future what ways do you think automobiles will be different from the automobiles of today?" "How will the car of the future run?"
FOLLOW-UP:	"What are the problems of the automobile today? What ways would you suggest to solve these problems for the future? What would you suggest to make the automobile of the future safer? Predict the speed of the future automobile."
SOURCE:	Janice Gudeman, PACE teacher
RELEVANCE:	Able students may help solve problems and design and plan products of the future. They may apply these methods and ideas to help solve problems of today.



Solar Powered:
AM/FM Radio
Lights
Engine
Seatbelts and Everything Else
Gas Powered:
Nothing
93 miles per sun ray

by Matt, grade 5

OBJECTIVE: To design and construct a model city of the future

MOTIVATION: Brainstorm a list of problems and issues that will confront us in the future. Discuss the ways in which these problems and issues and their solutions will affect our lifestyles. Make a list of buildings which may be included in cities of the future.

ACTIVITY: Using various materials (cardboard, styrofoam, paint, paper), each student constructs a scale model of a building or complex of buildings.

Skills involved in this project are:
- drawing to scale
- drawing scaled floor plans
- drawing a city map

Write a description of each building and the rationale for including it in a city of the future.

FOLLOW-UP: Students may wish to present their project to other children, teachers, and parents by arranging guided tours of the city and advertising it in the school newspaper.

SOURCE: Ann Robinson, PACE teacher, and the 6th grade PACE students at Mayflower Mill Elementary School

RELEVANCE: Able students need opportunities to select and plan their own projects which require application, analysis, synthesis, and evaluation. In addition, able students need opportunities to consider the challenges of the future.

SOCIAL STUDIES

SOCIAL STUDIES - I
SCIENCE
MATH

OBJECTIVES: To motivate the students to find more information
To familiarize students with resource materials

MOTIVATION: "Is a catacomb a feline version of a dogbrush? Find out what a catacomb is by tomorrow."

ACTIVITY: Students should be encouraged to keep a small notebook on hand to jot down assignments, ideas, etc. Suggest that they make a note to find out about a catacomb. Able students will follow up on this incentive and report to the class. As a result, much additional information is brought to the class by students rather than by the teacher.

FOLLOW-UP: Teachers will find it easy to make a pun, joke, or visual representation out of almost any word. Suggestion: Reserve a space on the board for this activity. When students see this, they will know it's something to investigate.

Examples:
"Is a logarithm the latest dance at the lumber camp?"
"Was Atom the first man on earth?"
"Is a tangram a sunbather from Western Union?"

SOURCE: Barbara Ilgen, PACE teacher

RELEVANCE: Able students may be more motivated to look up information if the stimulus is presented in a way that attracts and holds their attention. This activity, if done with imagination throughout the year, could start a pattern of "I'll find out" that could hold for a lifetime. Able children will retain and be able to draw upon and apply later what may appear at present to be isolated information.

SOCIAL STUDIES - II

OBJECTIVES:

To present challenges to be solved as a group
To build decision-making skills
To increase fluency, flexibility, and originality

MOTIVATION:

"If you could be in business, what business would you be in?"

Introduce and give the background of think tanks.

Discuss the large chart with Think Tank. (Note: Think Tank activities may extend over several class sessions.)

Practice session: "What are all the ways you can use a paper bag? What are all the ways you can use a smaller or larger paper bag?"

Brainstorm Session: "If you owned many old tires, what are all the different ways you could use these tires?"

ACTIVITY:

Divide into companies of four each. Each company chooses the challenge it will solve.

Examples of challenges:

1. Add new events to a track meet.
2. Name some uninvented inventions.
3. List fifteen different words to describe mud.
4. What could you do to a skateboard to make it more appealing?
5. Design a park for a city that will take up one block and have something to offer for people of all ages.
6. Design and draw a spaceship. Plan a space trip.
7. Life in the future will be very different from life as it is today. Invent a game that will be played 100 years from now. Describe equipment, rules, and clothing used for this game.

FOLLOW-UP: The Showdown. "This is competition between the companies. Think of as many ideas as you can. The secretary in your company will write the ideas down. Then we will compare your ideas with the other companies and find the original answers between the companies."

"How many ideas did your company have?"

"How many original answers did your company have?"

Examples for Showdown:
How is a picnic basket like a vase?
What are all the things that you can think of that are fast?
What are the uses of a pencil?

SOURCE: Think Tank*

RELEVANCE: Simulation games are valuable tools to learn competition and cooperation. It stretches the attention span and encourages intuitive thinking.

OBJECTIVES: To provide opportunities to explore the local judiciary and penal system
To learn awareness of careers in law

MOTIVATION: "Who makes the laws for our community? Who enforces the laws? What happens when a law is broken?"

ACTIVITY: Note: Prerequisite skills for this lesson are obervation, question-asking, inductive and deductive reasoning, inferential thinking and assumption testing. Suggested activities which reinforce these skills are:

1. "At the Scene of the Crime", GAMES Magazine*, March/April 1980
2. "The M & M Mystery", Think Big* (see page 120 in guide)
3. "The Shaggy Dog Mystery", Think Big* (see page 183 in guide)

List places to visit and people to interview that relate to our local judiciary and penal system.

The students prepare for their visits and interviews by developing questions, doing background research, and examining careers in law.

Arrange and conduct visits and interviews.

SOURCE: Suzanne Cole, PACE teacher

RELEVANCE: The skills listed above are higher level thinking and problem solving skills, appropriate for the able student. Investigation into careers in law is relevant to students who have potential for high achievement.

From Think Big: "The M & M Museum Mystery"
p. 15

"A very valuable vase was stolen from the museum. The theft was discovered right after the M and M group had left the museum. Everyone in the group said that he/she had seen the vase. The police reasoned that the LAST person in the group to leave the museum was the thief.

Here are clues to the time that each person left the museum. Who was the last to leave? Find out who the thief was by writing down the actual time each person left the museum.

Mal McKnight: 20 minutes before Margo Mills

Milly Maine: 15 minutes after Martin Maxwell

Mary Morrison: 50 minutes before Mal McKnight

Margo Mills: 35 minutes after Milly Maine

Martha Miller: 15 minutes before four o'clock

Morris Meed: 25 minutes after Mal McKnight

Martin Maxwell: 20 minutes before Martha Miller

Mike McCabe: 45 minutes before Milly Maine

Mack Moore: 10 minutes before Morris Meed."

SOCIAL STUDIES - III
LANGUAGE ARTS

OBJECTIVES: To prepare students to conduct a mock trial

MOTIVATION: Schedule a visit to a court in session.

ACTIVITY: Discuss the trial.
Explain procedures, terminology, and types of cases (criminal and civil).

Decide on a case to present as a mock trial.
Research the laws pertaining to the case, the roles of the participants, and the procedures for conducting a trial.
Present the trial to an appropriate audience.
Jurors may be selected from the audience.

FOLLOW-UP: Discuss the trial with those who have participated in and observed it.

SOURCE: Suzanne Cole, PACE teacher

Information and suggestions for this type of study can be obtained from the book Bright Ideas*.

RELEVANCE: This type of activity, particularly the preparation of the trial, requires self-directed, independent students. The investigation of the laws, the court procedures, and the background of the court system is most appropriately performed by students who are advanced in their reading and thinking skills,

SOCIAL STUDIES - II
SCIENCE - II
LANGUAGE ARTS - II

OBJECTIVES: To create an awareness of the characteristics of a biography
To motivate students to research a famous person and prepare a biographical sketch

MOTIVATION: Bring a skeleton (real or paper) to class and hang it in the room. "This is our guest for today. I'd like to introduce__________." Teacher should present biographical data on an explorer, an inventor, a politician, etc., as a review or an introduction to a topic or period. The teacher's method of presentation will be the model for future presentations, so it should be planned in the form which will be required of the students. The teacher might want to bring in a prop such as a hat, scarf, coat, belt, etc., to put on Bones during the presentation and encourage the students to do the same when possible.

Assign a character to students with dates for presentation. They may work alone or in a small group. Only the student(s) researching a character should know his/her identity, so the class is surprised.

ACTIVITY: Students prepare presentations from materials in classroom, library, at home, or from interviews with others about the person. They must collect information and prepare an oral presentation.

Students present on the schedule set by the teacher. If it's a review of material studied or currently being studied, they could be presented as riddles.

FOLLOW-UP:

1. Bones could disappear after the first round of biographies and then re-appear two units later several times throughout the year: perhaps first as a review, then as a current topic, and then as a motivator. The students will respond favorably to the return of an old friend.

2. This same method could be used to emphasize current events. (Suggestion: do this after Bones has been in the closet for a while.) Set aside time each day when Bones becomes someone in the news who presents the information from his point of view. It would be of interest to have the same event presented by adversaries in an event.

SOURCE: The Cementery Box by Don Mitchell and Gary Grimm. Good Apple, Inc., Carthage, Il. 62321, 1975. Card 102.

Barbara Ilgen, PACE teacher

RELEVANCE: It is important to capture the interest of able children and to provide the stimulus to motivate them beyond the minimal requirements. All students could do this activity to some degree or on some level, but able students have the ability to gather information from several sources, to synthesize it, and to present it with a flair. The activity also requires creativity as they develop a visual representation of the character.

The follow-up suggestion of current events involves higher level thinking skills. After reading the news article, the content must be translated to a particular point of view.

OBJECTIVE: To provide an opportunity for high level creative, evaluative, and logical thinking

MOTIVATION: "Imagine you are an explorer. Where would you like to explore?"

A simulation game is an activity that models a real life situation. "Close your eyes. Let your imagination go. Imagine yourself floating on water. There are no flowers, no trees, no land in sight. A family of dolphins looks at you curiously. Fish are surrounding you. The sun is glaring. The waves are tossing you up and down, back and forth. There's hope! An island is in sight!"

"What did you say or think when you arrived on shore?" Let students volunteer answers to this and other MOTIVATION questions.

"What did the characters in Swiss Family Robinson and Robinson Crusoe do to explore and survive?"

Pass out map of island. (See following page.) "You are an explorer. This island is about 10 miles wide and 20 miles long. Where is this island? Using longitude and latitude, locate this area on a globe. What kind of climate does this island have? What other places have a similar climate?"

ACTIVITY: "Explore the features of the island."

Pass out list of questions. (See following pages.) "Using research and map skills, plan your survival. You have only your clothes and a knife. The questions are there as a guide to you. You may work individually or with a small group. If you choose to work in a group, first think about these questions alone."

FOLLOW-UP: Creative Drama: Act out your adventures.

Select one or more of the following books. Compare and contrast the methods of survival described in the book(s) with those developed by the students.

Iceberg Hermit - Roth, Arthur

Island of the Blue Dolphins - O'Dell, Scott

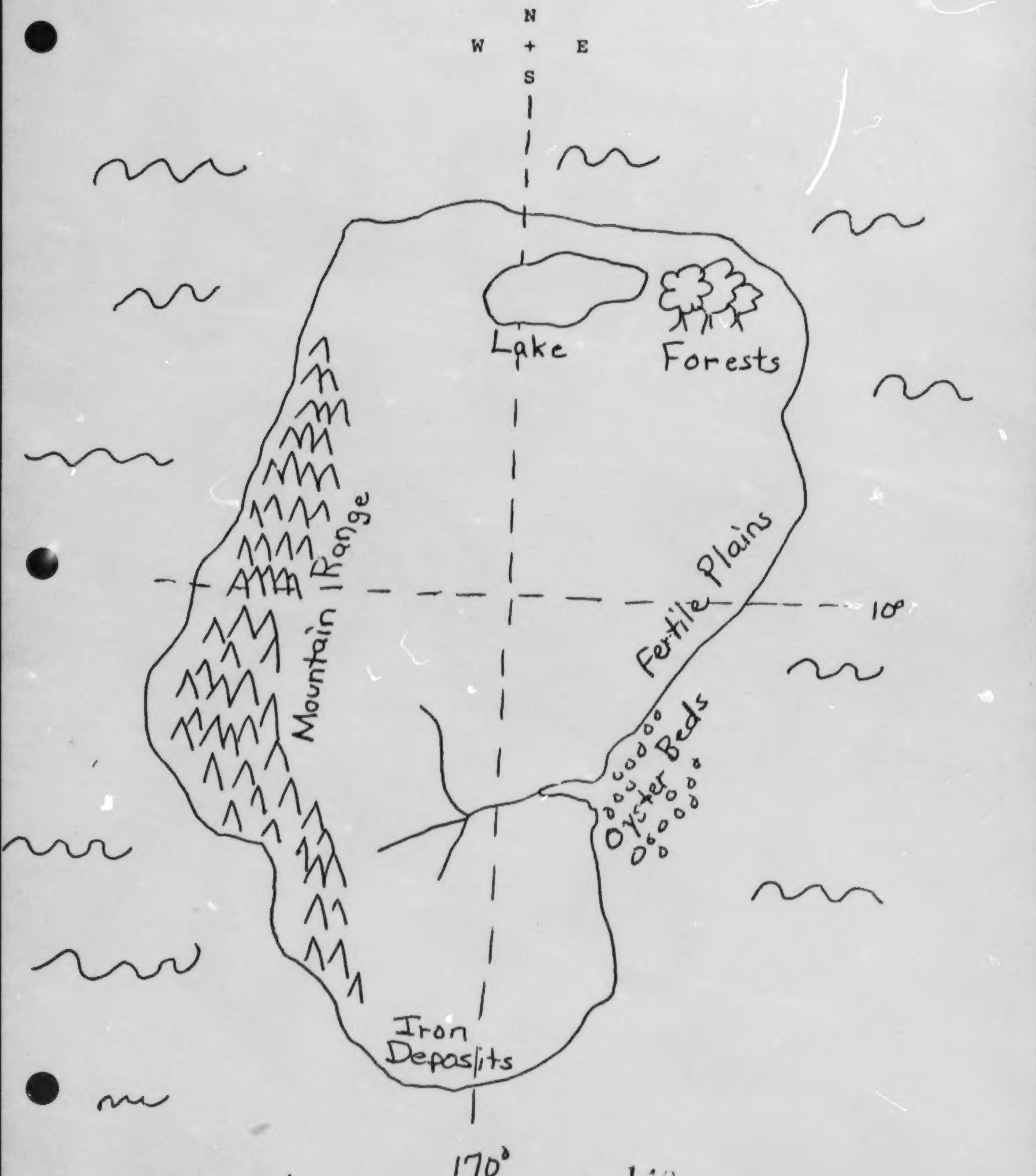
Julie of the Wolves - George, Jean C.

Robinson Crusoe - Defoe, Daniel

Swiss Family Robinson - Wyss, Johann

SOURCE: Janice Gudeman, PACE teacher

RELEVANCE: Simulation is a continuation of the method by which students have gained knowledge all their lives; by acting, doing, and living.


N
W
E
S
Lake
Forests
Mountain Range
Fertile Plains
10°
Oyster Beds
Iron Deposits
170°

QUESTIONS

1. Where will you find food? List what you will eat.
2. What will the weather be like?
3. Where did you land?
4. What natural resources does this island have?
5. How will you use the natural resources?
   How will you survive?
6. Where will you settle? Why?
7. How did you get to this island?
8. How will you build a shelter?
   How will you cut down trees?
9. What animals do you meet?
10. What will you name this island?
11. Where will farms be established? Why?
12. Where will you build your first community? Why?
13. How will you establish a government? What will it be like?
14. Where will you build roads? Will you attract tourists?

Write an outline of every day for two weeks, a diary of how you survived.

Describe and write about the history of your first days or settlement years.

Make a plan for future development of this island. Draw in roads, railroads, communities, farms, and other features.

SOCIAL STUDIES - II
CREATIVE PROBLEM SOLVING

OBJECTIVES: To encourage students:
to focus on pertinent factors
to identify with the feelings of others
to generate options or alternative choices
to evaluate options to select the best course of action

MOTIVATION: Read "Susan's Plight, Dora's Power" to class. (see next page).

ACTIVITY: "If you were Susan, what things could you do about this situation?"
Students brainstorm to generate all possible solutions without regard for the "goodness" of the ideas. Then, as a class, decide on the best ideas, the worst ideas, and the mediocre ideas. List all ideas on the board. Decide why they fit into each category. Erase the mediocre ideas. Decide how the best ideas differ from the worst.

FOLLOW-UP: Repeat the lesson format, using different stories as the stimulus for discussion.
The source for this activity may be used once in a heterogeneous classroom throughout the year! There are suggested variations in method of presentation and decision-making.

SOURCE: Learning to Think and Choose: Decision-Making for the Middle Grades* p. 142-143.

RELEVANCE: Able students will excel in the generation of possible solutions and their evaluation. Students need frequent exposure to this type of problem solving because of its relevance to daily decision making.

From Learning to Think and Choose: Decision-making for the Middle Grades
pp. 142-143

"Susan's Plight, Dora's Power"

"SOCIAL SITUATION

For purposes of this exercise, you are to imagine that the following things are true:

1. You are a twelve-year-old girl named Susan.
2. You live in Eagle Town, a town of 30,000 people.
3. Until recently, you and Dora were best friends for many years.

Dora lives across the street from your house. For more than two years Dora has delivered the Eagle Clarion, the local newspaper. Dora has used the money she made delivering the Clarion to buy a new bicycle, new clothes, and once, to visit Disneyland with a group from her church.

When Dora has been out of town, you have been her substitute. You delivered her papers and she always paid you $1.50 each day. For Sunday papers she has always paid you $2.00 because Sunday papers are heavier.

You have always been ready and willing to deliver Dora's papers for her. You have been glad to earn the money and you admire Dora and like to do things to help her. Most importantly, Dora has promised to recommend you as the person to replace her when she quits. She has always promised that she will help you get the paper route.

Three weeks ago, Dora decided that she would deliver the Clarion for six more weeks and then quit. She called her boss, the district manager, and recommended that he select you to replace her.

The district manager met with you, your parents, and Dora, and explained the job. He explained how much money you would make each month and how you would pay your bill, and best of all, how you could earn bonus money.

"For each week that you deliver the Clarion and no customer complains, you earn an extra dollar of bonus money. If you deliver the paper for an entire month without a complaint, you earn six dollars in bonus money."

143

Finally, the district manager said, "Susan, the job is yours if Dora tells me you know the route and can do the job when she quits. Between now and the time that Dora quits, you should learn the route, how to collect, and how to keep clear records when customers pay their monthly bill."

At first, you were happy to help Dora roll the papers and place them in plastic bags. You were pleased to carry the papers and deliver them to the houses as Dora taught you where your customers live. You were pleased to help Dora collect at the end of the month. You knew Dora was training you so you would be able to do a good job.

For the last week, though, you have not been happy to help Dora. You have rolled almost all the papers and delivered all of them. In fact, you are doing all Dora's work for her, but she is the person who will be paid.

You do not think this is fair. At first, you thought you would just do the work. After all, the route and the money will be yours next month. Lately though, you have begun to wonder what you might do. You have even made a list of things you might do in this situation."

SOCIAL STUDIES - II
SELF CONCEPT, LANGUAGE ARTS

OBJECTIVES:

To apply synectics to view a problem from an unique perspective
To develop fluency in speaking and writing
To examine attitudes and feelings

MOTIVATION:

Take a current event or a topic being studied. The student becomes a character in the situation or conflict. This may be the peasant in a Middle Age fiefdom, a parent of the assassin, etc. The teacher prepares questions which tap feelings, attitudes, and behaviors.

Example:
"You are an American who has been held hostage in Iran since the embassy was seized over a year ago. Today is January 18, 1981. Your captors have just announced that they are taking to to Mehrabad Airport. How do you feel? What is going through your mind?" Discuss, using Boundary Breakers techniques, p. 169, Curriculum Guide.

ACTIVITY:

Students write or discuss each of the questions. If they are writing, have them tell their stories, incorporating responses to the questions provided. Encourage them to use colorful, descriptive words. Suggest the use of comparisons (similes). Possible title: From Hostage to Free Citizen.

Questions:

1. How did you feel when you arrived at the airport and saw the 51 other hostages?
2. Did you know why you were there? If yes, how did you know?
3. How did you feel during the delay at the airport? Why did you feel this way?
4. How did you feel as you boarded the Algerian jet?
5. What did you do during the flight?
6. When did you first feel really free? How did that make you feel?
7. Did you have any concerns about returning to America and your family? If so, what were they?
8. You may choose whether or not to continue in foreign service. What will you do? Why?

"Illustrate your writing with 3 feeling pictures: how you felt as a hostage, how you felt waiting at the airport, and how you felt as a free citizen. Don't draw what you looked like or what you saw; draw what you felt like." Have them write on the back: hostage, airport, or free.

Mix all the pictures. Put children in groups of three or four persons and give each group some of the pictures. Have them sort the pictures into the three sets of hostage, airport, and free. They can turn the pictures over to verify their decisions when completed.

(This activity will produce good small group discussion about figural representation of feelings.)

FOLLOW-UP: Display pictures grouped by categories.

SOURCE: Barbara G. Ilgen, PACE teacher

RELEVANCE: Synectics is a creative thinking exercise which forces students to look at a situation from a different point of view. The response is totally theirs since they are the main character. They, of course, will draw from other sources to respond but will synthesize the information into something uniquely their own. This is an ability often neglected in the traditional curriculum.

SOCIAL STUDIES - I, II, III
LANGUAGE ARTS

OBJECTIVES:

To expose students to an in-depth study of the Middle Ages
To compare life during the Middle Ages with life today
To explore classic children's literature

MOTIVATION:

"Brainstorm all the things that come to mind when you think of the Middle Ages."

ACTIVITY:

The introductory text is Door in the Wall by Marguerite de Angeli, a Newbery Award book. This book may be read by 4th, 5th, and 6th graders. 3rd graders may prefer to see the film-strip and listen to the cassette.

Students begin with vocabulary study and creative writing. Invite a visitor from a group such as the Society for Creative Anachronism, a national organization which studies the Middle Ages and re-enacts various events.

Students may study heraldry in order to construct their own shields and symbols.

Students may read literature which deals with the Middle Ages, such as King Arthur by MacCloud. (See Middle Ages bibliography, following pages.)

Students may play the game "Dungeons and Dragons."

FOLLOW-UP:

Related topics include:
castle-making
stained glass
architecture
weaponry
medieval art
The Crusades

SOURCE:

Suzanne Cole, PACE teacher
Library books are found in the 398.2 and 921 sections.

RELEVANCE:

This study provokes many ideas for independent study, inspires students to read challenging literature, creates an interest in fantasy, and causes students to think about life in a radically different style and time. The Middle Ages is a topic not usually included in the elementary school curriculum.

A DOOR IN THE WALL by M. de Angeli

Find the meaning of these words. Use at least 10 in a story you create about medieval times.

liege

mail (in relation to knights)

plague

joust

fishmonger

victuals

cloisters

pallets

jennet

hospice

Vespers

monastery

Welsh

Scots

serf

portcullis

bastion

sentry

sacristan

yeoman

mace

medieval

Gothic architecture

vexation

A Warm-Up:
"Capture an adventure in verse. Write a poem beginning with the line: 'Said the dragon to the knight so brave.'"

SAID THE DRAGON TO THE KNIGHT SO BRAVE

Said the dragon to the knight so brave
"What princess have you ever saved?"
"It's not my fault I don't like to fight..."
To the knight scoffed the dragon,
"Your self-esteem sure must be saggin'."
And with that blow the knight turned red.
He right there slew off the dragon's head.
Rachael Grade 6

Said the dragon to the knight so brave
"Come fight with me in my cave.
Your lances they pierce, which makes you seem fierce,
But to me you are a knave."
Anonymous

Said the dragon to the knight so brave
"I bet you can't fit in the cave."
"you won't be about to fit in a wagon.
Oh. I'm so sorry." "Oh. Me too.
But dragon you are stepping on my shoe."
Lee Grade 3

A WARM -UP:

"You were on your way to school. You forgot your PACE notebook for the 15th time. You told your PACE teacher that a dragon (or monster) took it on your way to school and ate it. Describe what the dragon looked like, smelled like, felt like, and sounded like."

The dragon had purpure scales and a vert face. The dragon sounded like someone whispering through a tunnel. The dragon smelled like a sty full of azure pigs. The dragon felt like some or, sabel and gules mixed sand.

Erin. Grade 3

She was 7 feet exactly and wore a pink bow behind her left ear. She was pink with lots of scales and said she was Wilt Chamberlain's girl friend. Oh, she has fangs.

She had a high-noted voice and when she talked she didn't really talk, she sang. She smelled like a bottle of perfume. She felt like a silky soft pillow.

Susan. Grade 5

The monster leapt out at me growling. His growl sounded sort of like a harmonica, so it may not have been a growl at all. I wouldn't know he was there unless I heard his harmonigrowl because he was invisible. He didn't even have a shadow. As soon as I heard the harmonigrowl, I knew what was after me and started running. It was the dreaded Harmonigrowler. They are rare in this part of the country, but I guess I'd found one. I was running so fast I didn't look back. But I could hear the Harmonigrowler harmonigrowling right on my heels. I could also smell him. Could I ever smell him! He smelled just like burnt ice cream. So he was a Bricecream Harmonigrowler, the most dangerous kind! Suddenly I felt something like butter on my hand. I dropped my notebook. The Harmonigrowler stopped to look at it and I heard him stop harmonigrowling. Was I ever glad I'd escaped!

Rachael W. Grade 6

BIBLIOGRAPHY FOR KNIGHTS AND DAYS IN MEDIEVAL TIMES

Book of King Arthur and His Noble Knights, Mary Macleod, Lippincott, 1949.

Dictionary of Chivalry. Grant Uden, Thomas Y Crowell Co. N.Y. 1968

Golden Treasury of Poetry, Louis Untermeyer, Golden Press, N.Y. 1969

Kings, Queens, Knights, and Jesters, Making Medieval Costumes, Lynn Edelman-Schnurnberger, Harper, Row, N.Y. 1978.

Knights and Castle Learning Center, Thinking CAPS. Inc. 1979.

Paper Fun, Scholastic Book Service, Usborne Publ. Ltd. 1975. "Castle Building".

Story of King Arthur and His Knights, Howard Pyle

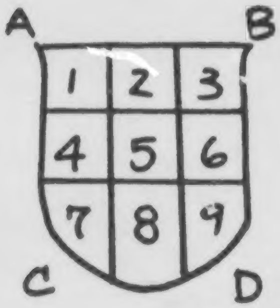
Story of Mankind, Hendrick van Loon, Liveright Pub. 1951.

Time Traveller Book of Knights and Castles, Hayes/Usborn Educational Progress Corp. 1979.

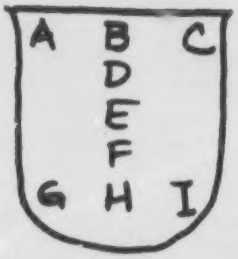
Numerous books were used by students from Purdue, West Lafayette, Lafayette, and Tippecanoe Libraries -- sections 940.1 and 398.

151

TERMS OF HERALDRY



A - B	upper margin
C - D	lower margin
A - C	Dexter margin
B - D	Sinister margin
1 - 2 - 3	Chief
4 - 5 - 6	Fesse
7 - 8 - 9	Base
2 - 5 - 8	Pale



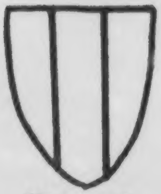
A : Dexter Chief Point
B : Middle Chief Point
C : Sinister Chief Point
D : Honour Point
E : Fess Point
F : Nombril Point
G : Dexter Base Point
H : Middle Base Point
I : Sinister Base Point

COLORS OF FIELD

OR - gold or yellow
ARGENT - silver or white
AZURE - blue
GULES - red

SABLE - black
VERT - green
PURPURE - purple

TERMS OF HERALDRY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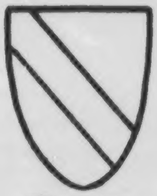
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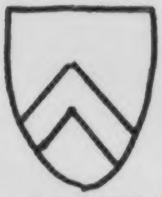
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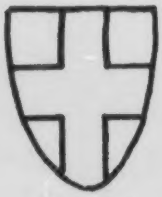
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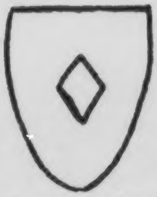
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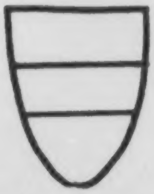
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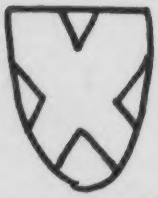
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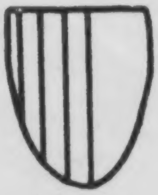
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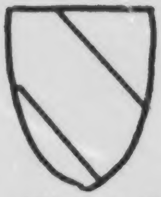
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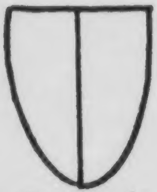
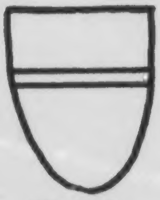
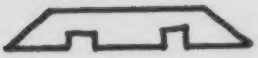
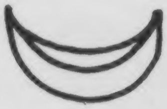
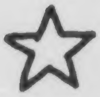

PARTY
PER
PALE

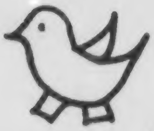

BAR

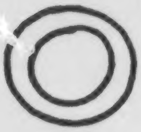
MARKS OF CADENCY


File or label : first son

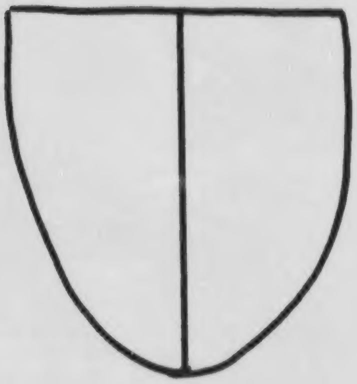

Crescent : second son

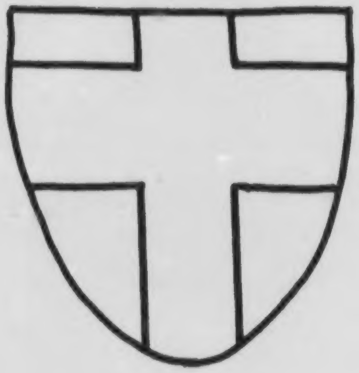

Mullet : third son

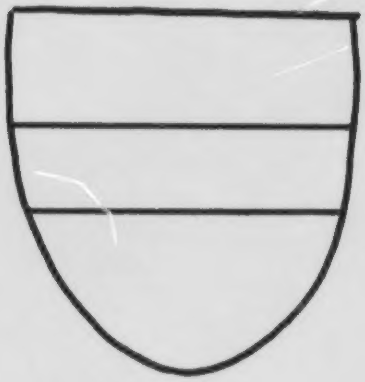

Martlet : fourth son

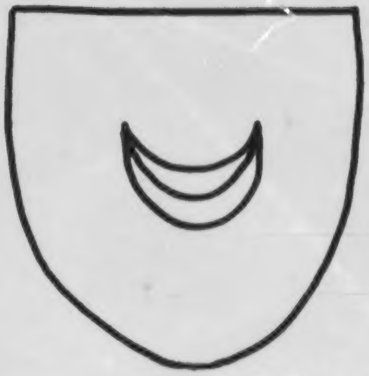

Annulet (ring): fifth son

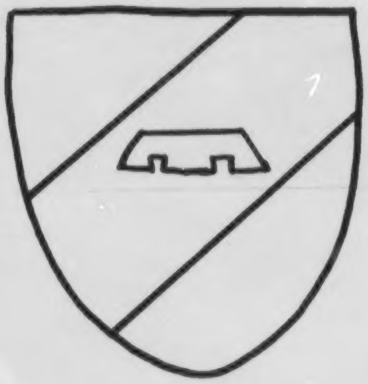
Write descriptions under these.

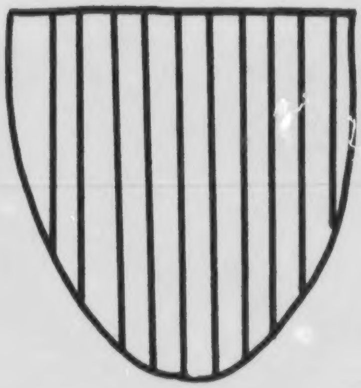


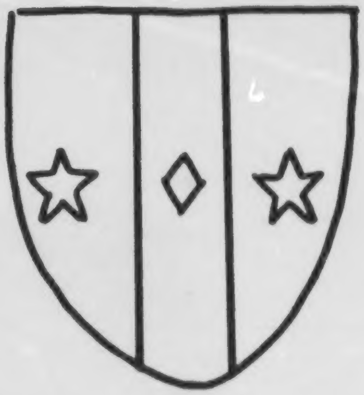


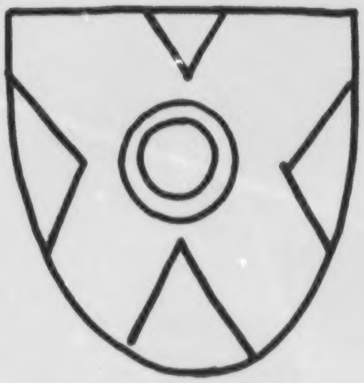


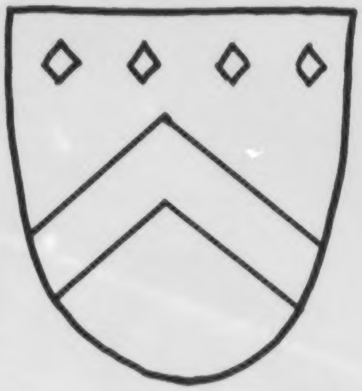




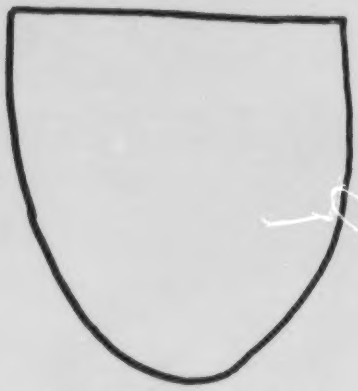




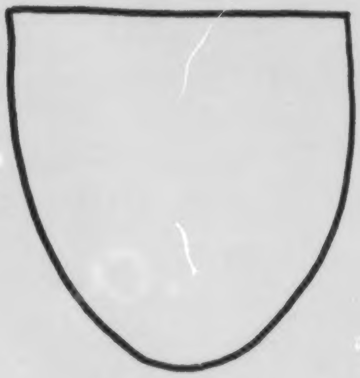




Following directions, draw and color these shields.



Vert a bendlet argent



Gules a chevron sable

Per pale purpure and argent

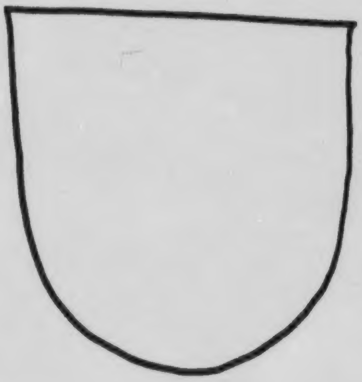
Or on a fesse azure between two crescents gules

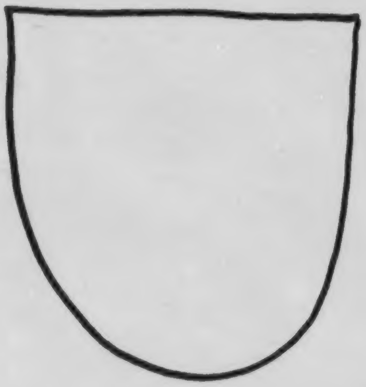
Sable a saltire or between four mullets argent

Argent three church bells and a bordure azure

Or three acorns in chief, on a fasse of the last, on an oak leaf sable

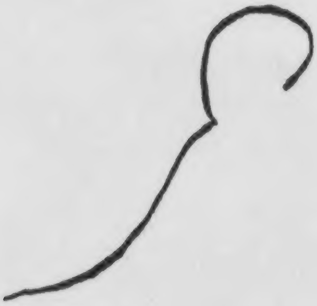
Design, color and describe your own shields.

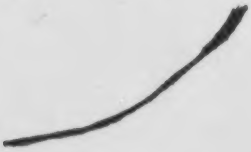


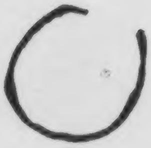


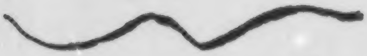
ART

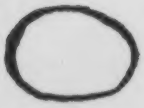
OBJECTIVES:	To increase figural fluency, flexibility, elaboration, and originality
MOTIVATION:	Present one of the standard optical illusions to the students. Discuss the possibility of looking at something in more than one way.
ACTIVITY:	Each student uses marking pens to complete drawings from lines given on the following page. Students are encouraged to take a number of the sheets, finding several ways to incorporate the given lines into drawings. At least one of the drawings, however, is to be _elaborated_ by adding details.
FOLLOW-UP:	Students share their drawings with others in the group, discussing their varied interpretations of the lines.
SOURCE:	_Creative Growth Games_ *
RELEVANCE:	This activity enhances creativity by encouraging students to look at the same stimulus from several perspectives.

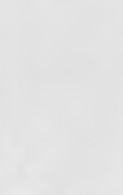


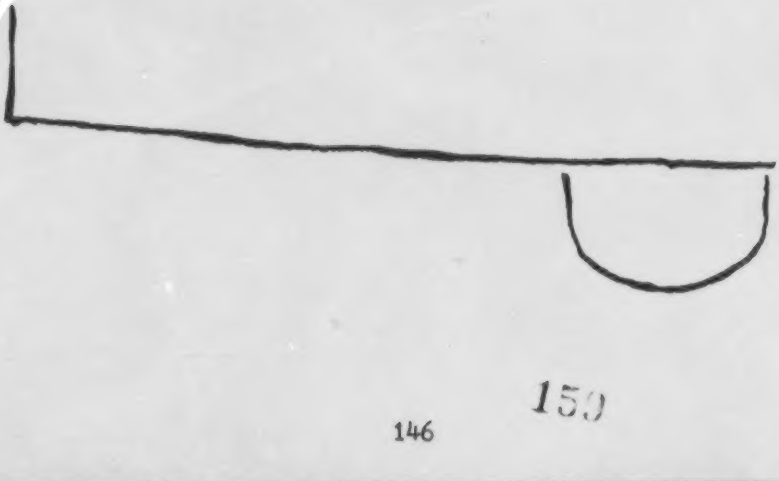




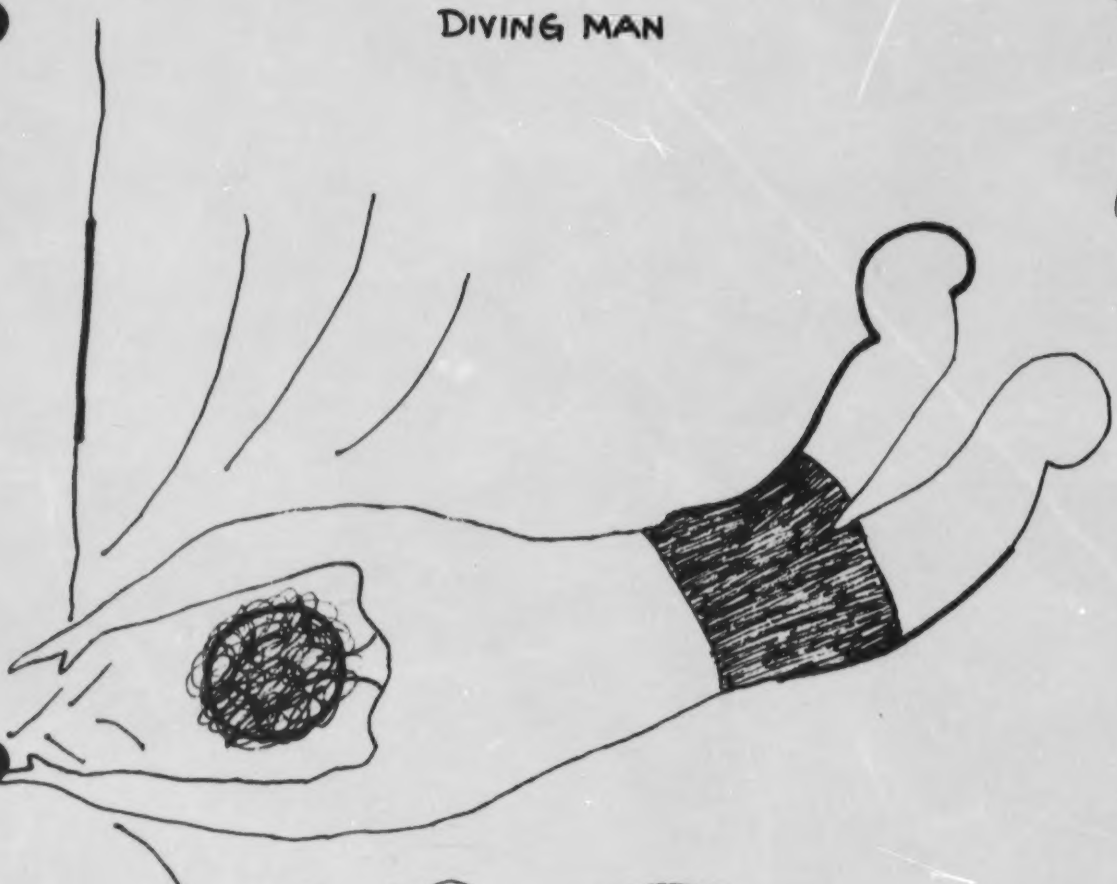


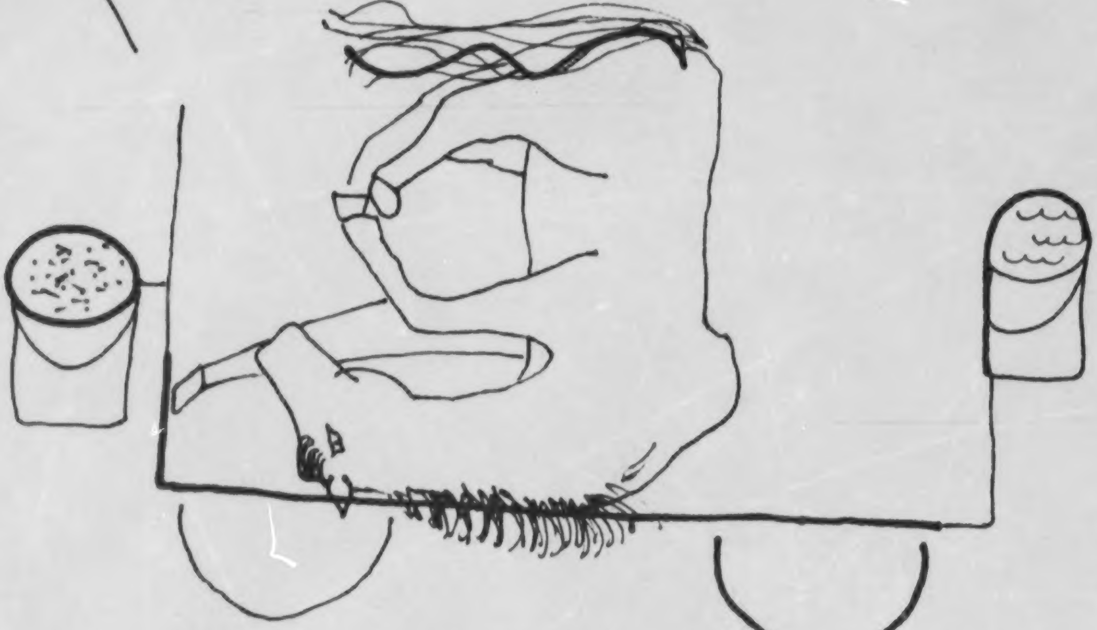






DIVING MAN





SOMERSAULTING HORSE

OBJECTIVES:	To provide the opportunity to discover more about themselves and their interests To encourage originality
MOTIVATION:	"What is special about you? What is a special or different quality, feature, or characteristic about yourself?" Discuss caricatures (a drawing emphasizing distinctive characteristics of individuals). Use political cartoon caricatures as examples.
ACTIVITY:	"Draw a caricature of yourself and write about it, perhaps in the form of a limerick."
FOLLOW-UP:	Students can share their caricatures with others. At first it may be difficult to talk about themselves, but this is a fun way to begin.
SOURCE:	Janice Gudeman, PACE teacher
RELEVANCE:	Caricatures can serve the purpose for students to get to know themselves and each other. A characteristic of able students is a sense of humor.

OBJECTIVES: To encourage flexibility
To help students think about and understand their personalities

MOTIVATION: Students talk about themselves and their interests.

ACTIVITY: Students complete the worksheet "The You Mirror".

FOLLOW-UP: Share "The You Mirror" (see next page) with others. Try to find the number, animal, weather, fruit, and flower in each others' pictures. Students may write down their specific talents; to become more aware of them. This can be extended to "How I can use this talent".

SOURCE: Janice Gudeman, PACE teacher

RELEVANCE: This activity will help students understand others, improve their self-concepts, and see themselves in new ways.

Charlie

THE YOU MIRROR

What kind of number is like you? 3

Why? My birthday is 24th and 3 comes between 2 + 4 : 24; it pops up.

What kind of animal are you like? Monkey

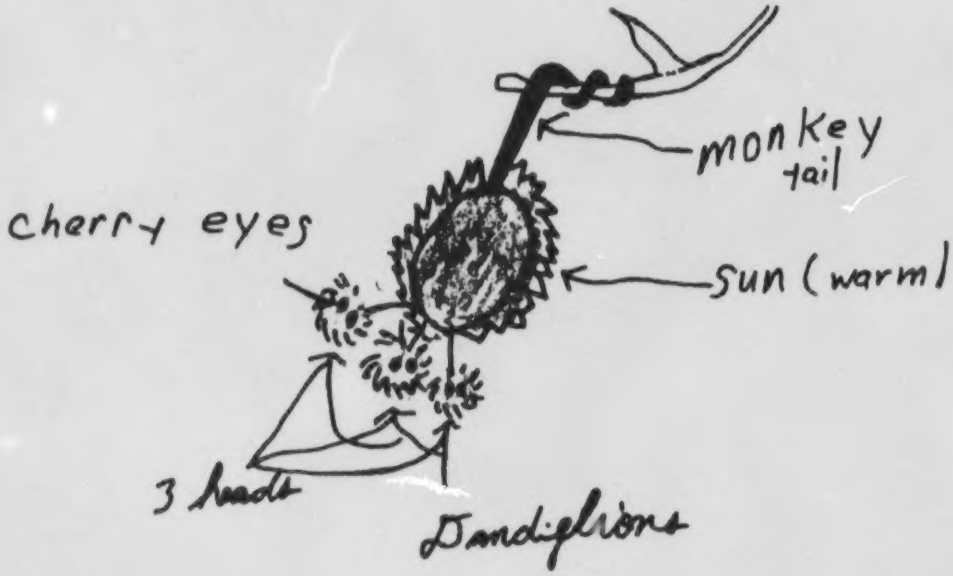
Why? I'm curious + funny

What kind of weather is most like you? warm Why? I'm warm + caring

What kind of fruit are you like and why? Cherry, I'm sweet + I like cherry flavor

What kind of flower is like you? Why? Dandelion, I'm bright

Now, put together parts of the number, the animal, the fruit, the weather, and the flower that are like you to come up with a new and interesting picture of yourself. Be creative!



THE YOU MIRROR Robin 9+

Grade 3

what kind of number is like you? number nine

why? Because I just turned nine, in November.

what kind of animal are you like? a Robin bird.

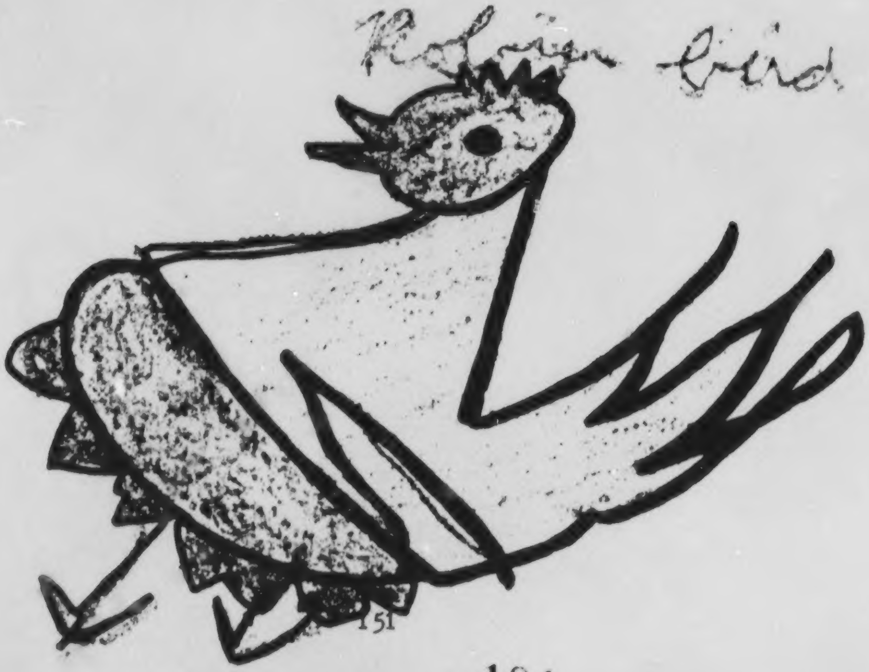
why? Becouse my name is Robin,

what kind of weather is most like you? why? spring because that is what bird [illegible]

what kind of fruit are you like and why? a Strauberry because it's red like a [illegible]

what kind of flower is like you? why? a red Rose because its red like a Robin bird.

NOW, put together parts of the number, the animal, the fruit, the weather, and the flower that are like you to come up with a new and interesting picture of yourself. Be creative!



ART - I
LANGUAGE ARTS

OBJECTIVES: To stimulate non-verbal creative expression

MOTIVATION: "People are doing more and more traveling around the world. This means that we are likely to be confronted with languages we do not speak or understand. Some information must be communicated to many people, no matter what languages they speak. Airports, train stations, and bus terminals need signs which communicate their messages without words. Many road signs are also adopting these non-verbal messages to tell us not to park or turn. We need many symbols to get the messages across."

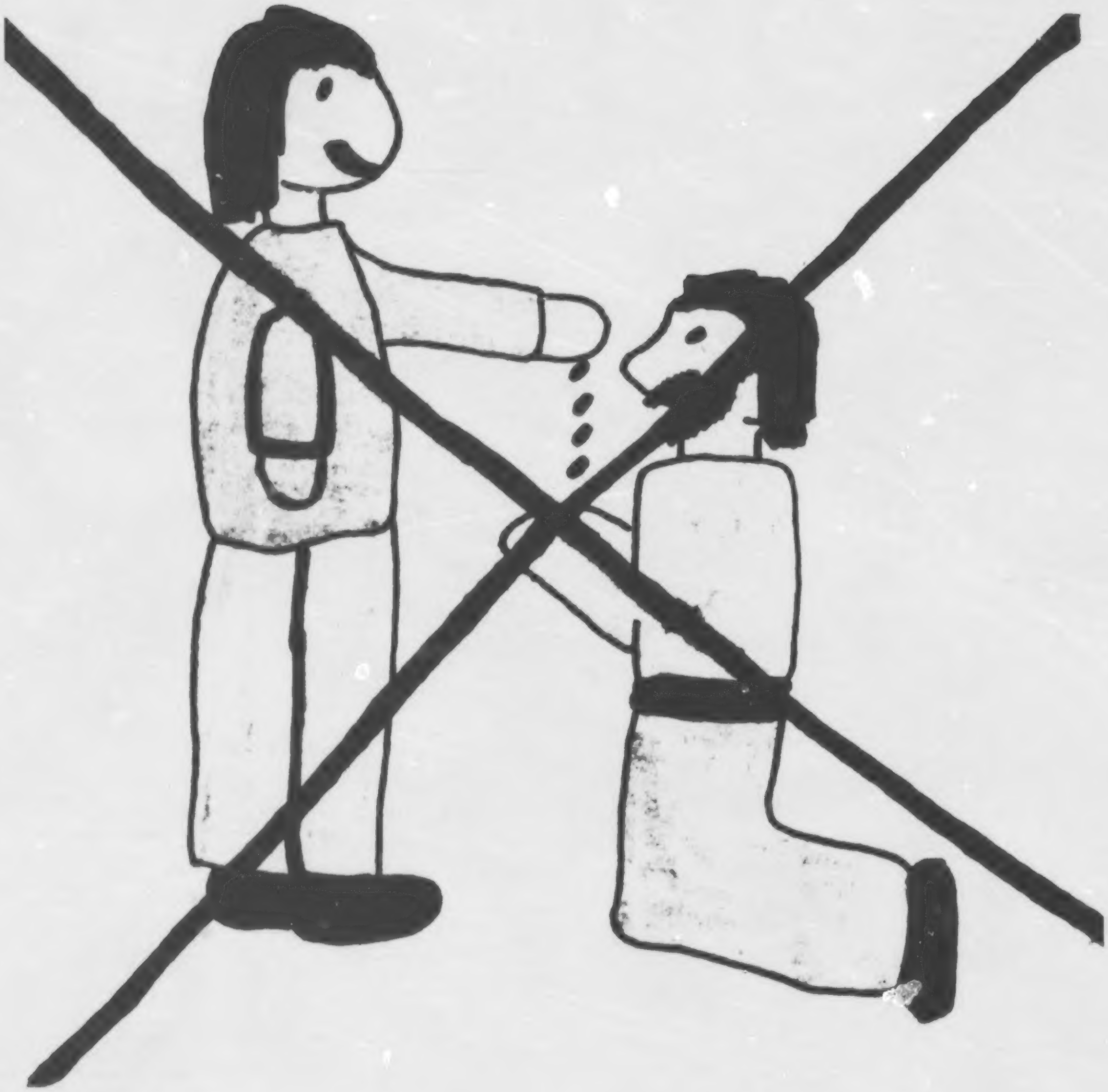
ACTIVITY: Brainstorm a list of needed messages for airports, train stations, and bus terminals.
Each student selects one of the messages and designs a symbol to communicate it.

FOLLOW-UP: Students share their ideas. They might wish to post appropriate ones around the school. A booklet might be assembled and sent to an airport.

SOURCE: Creative Growth Games *

RELEVANCE: This activity is appropriate for the development of non-verbal skills, frequently neglected in programs for able students.

No Begging or Soliciting



by Tracy

ART - I
LANGUAGE ARTS
SELF CONCEPT

OBJECTIVES:

- To develop verbal and artistic self-expression
- To present opportunities for group interaction
- To develop self concept
- To promote the development of good listening skills

MOTIVATION: Present the acronym PACE. Discuss acronyms (MASH, CHiPS, LASER). Present a logo (NBC peacock, the Exxon tiger, the MGM lion). Discuss logos as symbols of words or products.

ACTIVITY: Divide the group into pairs. Each student has a half sheet of white paper and crayons and markers. Without any discussion, each student is to create a symbol of him/herself. After the symbols are completed, each student tells his/her partner about the symbol and how that symbol represents the person.
Each partner then repeats what the other has said. In follow-up discussion, elicit that the purpose for the repetition is to insure good listening.

Each student may then present his/her partner, and the symbol, to the total group.

FOLLOW-UP: Students discuss the importance of good listening. Since there will be a good deal of group discussion during the group activities throughout the year, it is important to establish some of the guidelines for conducting discussions. Students should be involved in the development of these guidelines.

SOURCE: Suzanne Cole, PACE teacher

RELEVANCE: Able students need experiences sharing ideas with others like them. Development and discussion of symbols may show students that they have similar concepts and thoughts about themselves.

ART - I
SELF CONCEPT - I

OBJECTIVES:

To develop listening skills
To foster acceptance of others and self
To provide an opportunity for verbal and figurative expression
To examine and express values

MOTIVATION:

"We will be building Towers of Self. Before we start, we'll discuss some ideas." Set aside a short period of time each day to discuss the following ideas which they may include in their Towers of Self:

1. people they admire and why
2. goal possibilities for today and for the future
3. important issues in their lives (things they feel are important and would like to do something about)
4. important people, events, and things in their lives
5. hobbies and interests

Once the work on the towers begins, the teacher may want to write each child's ideas on a chart for student reference.

Use Boundary Breakers techniques, p.169 , Curriculum Guide.

After each day's discussion, talk about how the ideas could be represented on the towers; drawings, magazine pictures, photographs, original writings or writings by others (poems, sayings, quotations), and small objects such as coins, shells, stamps, rocks, etc. Urge them to bring in items daily. Provide paper sacks with names to collect items.

ACTIVITY:

Students make towers either from a pattern provided by the teacher or from large sheets of construction paper folded in fourths. Towers will stand. (Important: students work on the towers while flat. The last step is to staple the edges together to make them stand.) Rubber cement will hold items onto towers. If half circles are cut on the folds, items attached will stand out.

Children attach items to represent things important to them. Staple towers' edges together so they stand up.

Each child explains his/her tower. (e.g. "I've had a rock collection for 3 years. Here are 2 specimens, a __________ and a ____________." He/she continues with an explanation of each item on tower.

Suggestion: Hear only a few presentations each day. It is important to create an atmosphere of free expression, honesty, and acceptance.

FOLLOW- UP: Locate a place to display towers. Urge students to explain their towers to others, especially their families.

Note: The teacher should participate fully in the discussions and in the tower construction, sharing his/her ideas on the topics. This encourages students to answer honestly.

SOURCE: Bright Ideas, p. 33-40*.

RELEVANCE: Any student can benefit from a clarification of his/her ideals, goals, and interests. However, students of like abilities will be more empathetic with the others' ideas. Able students will express mature ideas, particularly in the "important issues" area. This often opens them to friendships with others of similar interests. A teacher may want to use this activity near the beginning of the year.

A small group is essential (10 or less) to the maintenance of interest. If a teacher wants the whole class to do this activity, keep the discussion groups small and group by ability for the discussion part. The construction and the presentation of the towers can be entire class activities.

ART - I, II
LANGUAGE ARTS

OBJECTIVES: To promote an awareness of the problems faced by handicapped people

To stimulate divergent thinking and imagination

MOTIVATION: "What skill would you like to develop that you don't now have?" (discuss)

Introduce the life and art work of Joni Eareckson, the victim of a diving accident. Today, still able to move only her neck and head, Joni has become a skillful artist, using her mouth to guide her pen.

ACTIVITY: "Joni is paralyzed; she cannot feel or walk. Describe to her the touch of a puppy."

"Jog in place. Describe the feeling after jogging."

"Close your eyes. Let your imagination go. Imagine yourself exploring and climbing in the mountains."

"Describe the beauty of snow-covered mountains to someone who cannot see."

"Describe the sound of a bird singing, the taste of an orange, the smell of a rose."

"Draw the sound of an earthquake for someone who cannot hear."

FOLLOW-UP: Read biographies of handicapped people: Louis Braille, Franklin Roosevelt, Helen Keller, etc.

Learn some of the manual alphabet and some simple signing. Discuss communication with blind, deaf people.

SOURCE: Janice Gudeman, PACE teacher

RELEVANCE: This is an opportunity for students to be encouraged to overcome difficulties and use their potential. This type of activity may help them understand and communicate with the handicapped.

OBJECTIVES: To develop convergent thinking skills

To develop creativity in music

MOTIVATION: "If you were writing a song, what would be its title?"

ACTIVITY: Introduce the life of Johannes Chrysostomus Wolfgangus Theophilus Mozart. Mozart was called the "Wonder Boy." He could play thirds at the age of three and composed his first minuet at the age of five. He traveled, gained fame, and shared his talent at a very young age.

Play a record of one of Mozart's compositions.

"If you could compose at the age of 5, how would you feel about your talent?

Would you want to share your talent?

Would you want to travel and perform for hundreds of people?

Would you like the fame?"

FOLLOW-UP: Discuss the names of notes, signatures of music, and other topics of music theory.

Create rhythm patterns with names of trees, flowers, animals, birds, or others. Say or sing the following words in the indicated rhythm.

Sycamore ♩ ♩ 𝅗𝅥
Sassafras 𝅘𝅥𝅯𝅘𝅥𝅯𝅘𝅥𝅯
Tulip tree ♩ ♪♩
Morning Glory ♩♪♩♪

Water lily ♪♪♪♪
Daisy 𝅗𝅥 𝅗𝅥
Sunflower ● ♪♪

Students can create and then play a rhythm with a clue as to its category. For example, "This is a flower: ♪♩♪" (petunia)

Create song titles and words to a song.

Compose a song.

SOURCE: Janice Gudeman, PACE teacher.

RELEVANCE: Establishing a foundation in music in the lives of able students is very important. This activity involves reasoning skills, synthesis, and pulling together facts and definitions.

ART (MUSIC) - II
SCIENCE

OBJECTIVES: To help develop creative listening and music skills

To discover and explore music and nature

MOTIVATION: "If you could be an animal, what kind of animal would you like to be?"

"What are some beautiful sounds and sights of nature and animals that you enjoy?"

ACTIVITY: While listening to music:

1. "Draw what comes to mind when you hear the music. When the music changes to a different song, continue with your picture or picture story showing the change. You may begin a new picture when the music changes."
2. Create a puppet show, or move puppets to the rhythm of the music.
3. Become a rainbow, sunset, sunrise, waterfall, cloudburst, or lightning. Become a part of nature. Become what you would like.
4. "Describe the music to someone who can't hear it."
5. "Does the music want to make you walk, run, hop?"
6. "Does the music remind you of a color? What color?"

FOLLOW-UP:

1. Brainstorm: "How are music and nature alike?" (e.g., rhythm; the seasons; day and night)
2. Discover and associate the gaits of the horse with the rhythm of music. The walk is a four-beat gait. The trot is a two-beat gait. The canter is a three-beat gait. The gallop is a four-beat gait, the pace a two-beat gait.
3. What animal are you like? Why? What instrument are you like? Why? Put together parts of the animal and instrument to create a new picture of you.

SOURCE: Janice Gudeman, PACE teacher.

RELEVANCE: One characteristic of able students is the ability to see relationships. This lesson provides an opportunity to discover relationships between music and nature.

ART (MUSIC) - II
SCIENCE

OBJECTIVES: To foster creativity and elaboration through person-to-object analogies

MOTIVATION: "You are an animal in the forest. Streams, fields, flowers, trees, sky, birds, fish, and animals surround you."

ACTIVITY: Ask leading questions in encounter lesson format.

Set 1:

1. "What kind of animal are you? Talk or sing in your language."
2. "How does the forest look to you today?"
3. "Tell us, the other animals, about a tree, flower, sky, or another animal or part of nature."
4. "Tell us, the animals, about an adventure in the forest."
5. "Tell us about an event at the time of the sunrise, sunset, spring, summer, autumn, or winter."
6. "What are the sounds of the forest that are like music?" (Sing them.)

Set 2:

1. "What have you seen today that is unususal in the forest?"
2. "The animal friends are together. Tell us about your animal family."
3. "Tell us how you have helped another animal friend(s)."
4. "A squirrel is chattering. What is the exciting news?"
5. "A fire! How will you get all the animals together to help get the fire out?"
6. "A group of students are walking. What are they interested in? What will they collect?"
7. "If you could talk to people, what would you tell them?"
8. "Mysterious tracks! Who made these footprints?"

FOLLOW-UP:

1. Take a nature hike.
2. Make animal tracks.
3. Study animal, bird, and nature sounds.
4. Study the characteristics and living habits of animals.
5. Read Bambi.
6. Make up a play with a forest and a rainbow as the setting.
7. Sing songs, such as "My Favorite Things," "Do, Re, Mi," or "Talk to the Animals."

SOURCE: Janice Gudeman, PACE teacher.

RELEVANCE: The encounter lesson provides the able student an opportunity to bring uniqueness to the task.

CREATIVE PROBLEM SOLVING

CREATIVE PROBLEM SOLVING

Creative problem solving is the major focus of Stage II. PACE students begin CPS following a foundation of basic thinking activities emphasizing the creative thinking processes.

It is critical that capable students learn problem solving methods, since it is expected that their future activities, careers, and life styles will involve them in situations which call for creative problem solving. A medical researcher may use CPS in the search for the cause of a disease. A teacher may use CPS to design a challenging course of study or educational program. A space agency computer programmer may use CPS to trouble-shoot a critical breakdown. Families may use CPS to deal with problems in the home or to decide on vacation plans.

Learning specific techniques of creative problem solving and practicing them in a variety of situations will prepare students for Stage III, Independent Study, in which they will determine their own area of study and plan for carrying it out.

An overall plan for developing creative problem solving skills is to introduce various techniques, one at a time, and have students practice them before synthesizing the various techniques into a total problem solving process.

The most basic technique is brainstorming. Brainstorming is used in many problem solving situations for the purpose of generating large numbers of ideas. The rules for brainstorming are as follows:

1. Quantity of ideas is the goal.
2. No evaluation or criticism is allowed until the idea generation is completed.
3. Wild, imaginative ideas are encouraged.
4. "Hitch-hiking" or building on others' ideas is encouraged.

All ideas are written down as they are suggested. No discussion takes place until the brainstorming is completed. Then each idea is considered as it relates to the problem or situation. Ideas are selected, combined, and organized into a solution. Brainstorming can be used to suggest ways of raising money for a proposed trip, methods of researching the habits of a particular animal, or proposals for creating awareness of the importance of energy conservation in the home.

SCAMPER is a creative problem solving technique which is used to stimulate creative thinking (Eberle,* 1971). SCAMPER provides a checklist for questioning "In what ways might we...?" One way of applying the SCAMPER technique is to take a common object, such as a telephone, and suggest ways to improve it.

S	Substitute
C	Combine
A	Adapt
M	Modify, magnify, minify
P	Put to other uses
E	Eliminate
R	Reverse

As with brainstorming, the ideas and suggestions are recorded, discussed, evaluated, and synthesized into a comprehensive solution.

Synectics is a technique for problem solving which approaches the problem by searching for analogous situations or points of view to aid in the solution. Approaching the problem first from a fantasy point of view, participants are instructed to let their imaginations go, to suggest far out, unreal ideas without concern for practicality. From the fantasy analogy, students move to a direct analogy, looking at similar situations, settings, or institutions, and attempting to relate these to the problem being solved. The third analogy used in a synectics approach is a personal analogy. Students look at the problem from the inside out, attempting to become a part of the problem in order to approach a solution from a different perspective. Once these three analogies have been investigated, the students examine their ideas and propose possible solutions to the problem.

Several other techniques for problem solving, such as attribute listing, bionics, forced relationships, and morphological analysis, may be taught to students. Descriptions of these may be found in sources such as Creative Problem Solving in Gifted Education (Feldhusen and Treffinger, 1980), Design Yourself*, and lessons found in the Creative Problem Solving section of this guide.

Following awareness of a number of methods for problem solving and opportunities to practice them, students are exposed to a creative problem solving model. The model gives the students a framework and a step by step progression through the process. The model (p.168) is presented to the students who work through it in small groups under the guidance of a teacher or leader. Initially the problem statement (step III) may be presented to the students and the process completed from that point on. More experienced or older problem solvers may begin at the first step and generate their own problem.

If students generate their own group problem, guidance will probably be necessary to help them narrow the problem appropriately and ensure that they are attacking a problem which they can solve. Many well-intentioned youngsters have set off to "solve" the energy crisis when a more appropriate problem for them to attack would be "How can we convince our families to conserve energy at home?"

In practicing the problem solving process, students will learn where the various strategies such as SCAMPER, synectics, forced relationships, and others fit in. They also experience synthesizing a comprehensive solution and planning the implementation. It is important that emphasis is given to the careful planning of the implementation. It is this step which makes the problem solving process real.

The "mechanics" of engaging in problem solving include establishing small groups (7-9 individuals), selecting a recorder who writes down the ideas generated, and designating someone to keep the process moving, remind the problem solvers of such things as the rules for brainstorming, and suggest (if no one in the group does) strategies which might appropriately be applied.

There are no prescribed or suggested time limits for the problem solving model. That will be determined by the nature of the problem and by the level and composition of the group. It is entirely possible to break up the model and complete one or two of the steps at a time to maintain interest and maximum involvement.

As with other processes in the Three Stage Model, it is important to evaluate or debrief following a creative problem solving experience. Students should consider the overall success or failure of the process, where it might be improved, whether the goal was accomplished and the problem solved, and whether the solution is realistic, practical and can really be implemented.

Creative problem solving is a systematic, real-world process, and it is the goal of these activities and procedures to give students a tool which can be used in other situations, particularly in independent study.

CREATIVE PROBLEM SOLVING

I. PROBLEM GENERATION
  A. WHAT ARE THE PROBLEMS OUR COMMUNITY FACES AS WE ENTER THE NEW DECADE? BRAINSTORM PROBLEM IDENTIFICATION.
  B. WHAT ARE THE MOST CRITICAL AND GENERAL PROBLEMS? PICK 3, THEN 1.

II. PROBLEM CLARIFICATION
  A. WHAT ARE ILLUSTRATIONS OF THE PROBLEM?
  B. WHAT ARE THINGS THAT CAUSE THE PROBLEM?
  C. WHAT ARE FURTHER PROBLEMS CAUSED BY THE PROBLEM?

III. PROBLEM IDENTIFICATION
  A. STATE THE PROBLEM IN LIGHT OF STAGE II DISCUSSION
  B. STATE THE PROBLEM AS A "HOW" QUESTION.

IV. IDEA FINDING
  A. WHAT COULD WE USE?
  B. WHAT COULD WE DO?
  C. BRAINSTORM SOLUTIONS.

V. SYNTHESIZING A SOLUTION
  A. PICK OUT THE BEST ELEMENTS FROM STAGE IV.
  B. DEVELOP A COMPREHENSIVE SOLUTION.
  C. DOES IT FIT THE PROBLEM STATEMENT?

VI. IMPLEMENTATION
  A. WHO?
  B. HOW?
  C. WHAT ORDER OF EVENTS?
  D. PRECAUTIONS - OBSTACLES
  E. HOW TO OVERCOME OBSTACLES
  F. LOCATIONS
  G. HOW TO SELL IT

BOUNDARY BREAKERS

Boundary breakers are questions to develop speaking and listening skills while students learn more about themselves and others.

Boundary breakers can be designed to introduce a lesson, to spark interest in an upcoming topic, or to rebuild "groupness" at the end of a lesson.

Boundary breakers may provoke a higher level of thought that merges cognitive and affective thinking.

Psychological safety and acceptance are essential to the success of boundary breaking.

Instructions: Leader

1. Sit in a circle.
2. The leader is a participant and responds to the question, also.
3. The leader states the question and calls upon a student within the circle. This person responds; the person to the right or left responds next.
4. Responses are repeated by the leader, because of the possibility that someone has not heard.
5. The leader is a model of keen interest and listening.
   If there are side comments, the leader waits patiently and then moves on to the next person. After several sessions the side comments dwindle.

Instructions: Participants

1. Each person is to answer according to the way that s/he interprets the questions. There will be no discussion or debate.
   It is okay to have identical responses, if the response is honest for you.
2. When a person needs more time to ponder and reflect, this can be indicated by saying "pass." The leader returns to this person at the end of the first round of questions for a response.
   At this time if the person wishes not to respond, this can be indicated by "pass-pass."
   Passes are to be accepted with as much positive acceptance as any response.
3. While each person is answering, observe and learn more about others.
4. The key word is LISTEN.

Examples of Boundary Breakers

1. If you had one free hour of time, how would you spend that time?
2. What is the title of the best book you have read?
3. If you could learn a new sport, what sport would you like to learn?

Source: Sisk, Dorothy, Teaching Gifted Children, unpublished manuscript.

CREATIVE PROBLEM SOLVING -II
SOCIAL STUDIES

OBJECTIVES: To increase fluency

To stimulate scientific thinking with a problem-solving approach

MOTIVATION: Discuss the steps of brainstorming. Discuss: put to other uses, adapt, modify, magnify, substitute, minify, rearrange, combine, reverse.

ACTIVITY: Brainstorming Topic: "If you could invent a machine (or a product), what would you invent?"

Divide into groups of two or three. Select an invention or product. Plan the advertisement and then advertise your invention or product.

CONCLUSION: "Think of as many ways as you can for an elephant to use his trunk."

Think of unusual uses for common objects, such as a toothbrush, walnut shells, etc.

SOURCE: Schaefer. Charles E. Developing Creativity in Children. Buffalo, New York: D.O.K. Publishers, Inc., 1973, pp. 90-95.

Design Yourself* Suggestion: Use the chart with the pictures of the frog for magnify, minify, etc.

RELEVANCE: Characteristics of able students are a liking for new ways of doing things and an interest in brainstorming. These techniques are helpful in solving problems of today and, also, with problems and challenges of the future.

OBJECTIVES: To develop the ability to find imaginative uses for common objects
To develop the ability to synthesize unlike objects into a comprehensive solution

MOTIVATION: "What are some things you have around your house which you no longer use?"
List these objects.
As a group, select one of the objects and create some unusual uses for the object.

ACTIVITY Provide students with a list of seven or more common household items (e.g. wooden spool, umbrella, string, orange, coat hanger, hairbrush, plastic margarine container).
Instruct the students to create something new using as many of the items as possible.

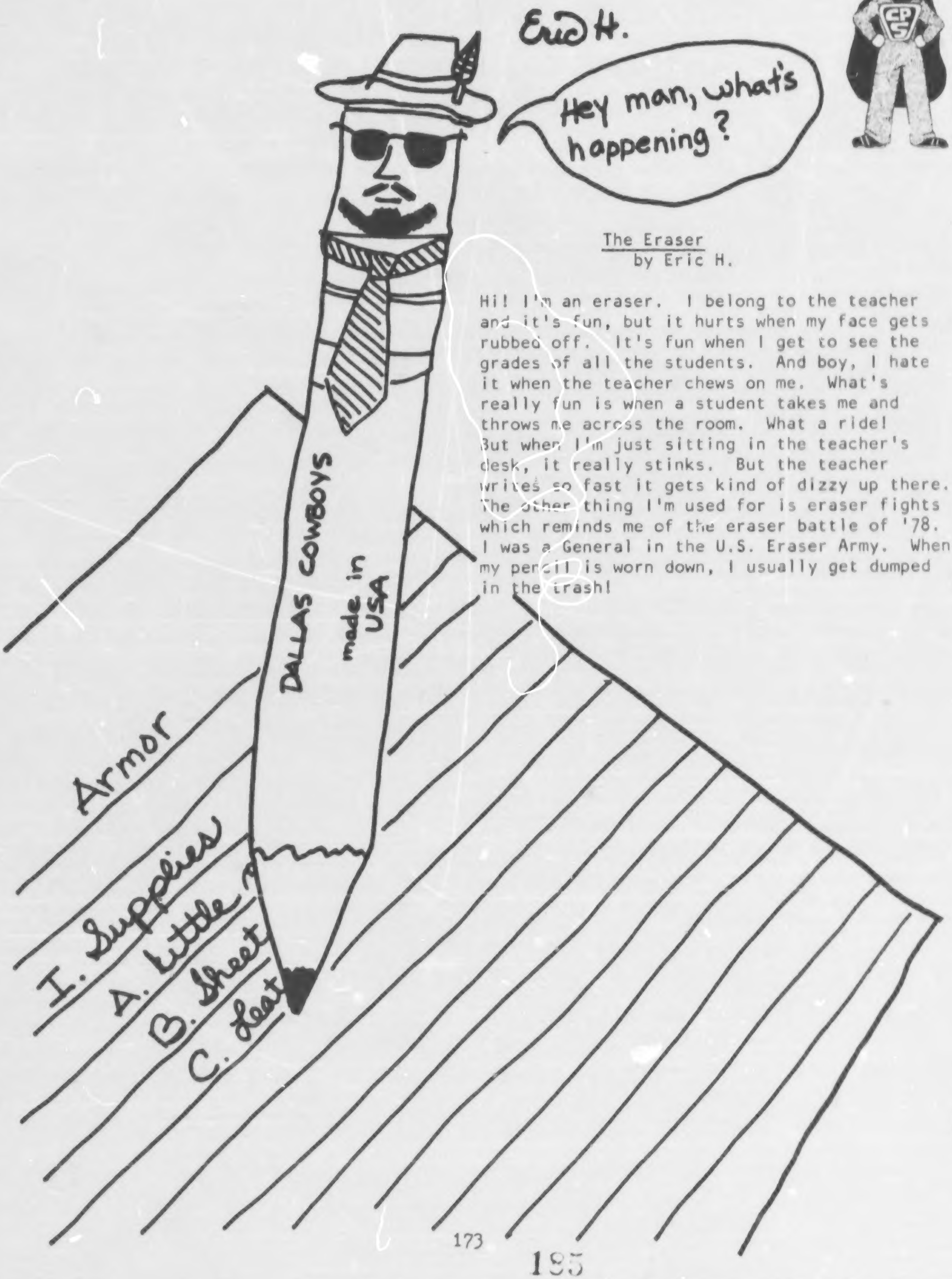
Students should brainstorm a list of criteria to evaluate their inventions.

FOLLOW-UP: Students may write a paragraph describing their invention and how it works. They may wish to complete an elaborate colored drawing, instruction manual, or a newspaper advertisement for their invention.

SOURCE: Ann Robinson, PACE teacher

RELEVANCE: Able students need opportunities to generate unusual responses to open-ended problems. The synthesis required in this activity is a higher level thinking skill as are the development and application of evaluation criteria.

OBJECTIVES:	To develop the creative imagination To explore analogy, specifically person-to-object analogy To look at common objects from a new perspective
MOTIVATION:	"Let's think of some things -- common objects around us. Try to think of things we take for granted. Pretend you are a fork! What is your life like? How do you look at things? What has happened to you recently?"
ACTIVITY:	One of the students is selected to be an object -- perhaps a pencil. S/he is interviewed by others in the group.
FOLLOW-UP:	Brainstorm a list of inanimate objects and select one. Write a description from the point of view of the object.
SOURCE:	Sunflowering* "If You Were"
RELEVANCE:	This activity helps students think creatively; practicing fluency, flexibility, originality, and elaboration. Analogies help students develop analytical skills.


Eric H.
Hey man, what's happening?
DALLAS COWBOYS
made in USA
Armor
I. Supplies
A. Little
B. Sheet
C. Leat

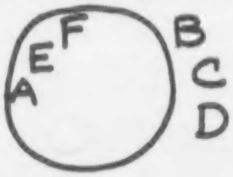
The Eraser

by Eric H.

Hi! I'm an eraser. I belong to the teacher and it's fun, but it hurts when my face gets rubbed off. It's fun when I get to see the grades of all the students. And boy, I hate it when the teacher chews on me. What's really fun is when a student takes me and throws me across the room. What a ride! But when I'm just sitting in the teacher's desk, it really stinks. But the teacher writes so fast it gets kind of dizzy up there. The other thing I'm used for is eraser fights which reminds me of the eraser battle of '78. I was a General in the U.S. Eraser Army. When my pencil is worn down, I usually get dumped in the trash!

OBJECTIVES: To encourage careful observation
To develop an effective technique for solving problems
To develop figural flexibility

MOTIVATION: Place this figure on the board or on a card.



Challenge the students to determine the system for placing letters inside and outside of the circle.

ACTIVITY: Students suggest possible solutions.

FOLLOW-UP: Students may want to offer similar problems for the group.

SOURCE: Creative Growth Games *

RELEVANCE: Most able students are motivated by this type of puzzling problem, in which the solution may be obv.ous or may require persistence.

ANSWER: Straight letters are placed within the circle, rounded letters outside.

OBJECTIVES: To encourage creative responses
To increase flexibility

MOTIVATION: Give students the following situation:

"A heavily loaded truck is approaching a tunnel. The driver suddenly realizes that his load is too high to fit into the tunnel and he slams on the brakes at the last minute. He stops safely and steps out. Sure enough, his load is a couple of inches too high. Already a long line is forming behind his truck, but he can think of only two solutions to his problem; either partially unload his truck, which would take considerable time and require his return after passing through the tunnel to retrieve objects left behind. Or, he could go forty miles out of his way, via a road with no tunnel, if he could turn around in the traffic jam he had created."

How would you solve this problem?

ACTIVITY: Students suggest possible solutions and evaluate information given. Emphasis is placed on suggesting alternatives and the feasibility of each. Although there are possible solutions, it is expected that a student will realize the most efficient solution is for the driver to let some of the air out of his tires.

SOURCE: Creative Growth Games * , p. 62.

RELEVANCE: The solution is not difficult but different, and able students are challenged by this type of activity.

OBJECTIVES:	To develop question-asking skills in order to clarify a problem. To provide experience in drawing inferences
MOTIVATION;	Read "Missing on Monday" (see next page). (It's helpful to write the clues on the board or duplicate them.)
ACTIVITY:	The students write questions for each suspect. The teacher or another student may want to role-play each suspect during questioning, answering the questions posed by the students in as few words as possible and volunteering no information.
FOLLOW-UP:	Students may write the conclusion or solution to the mystery, explaining their reasons for their decisions. Variance in solutions is expected. However, each solution should be supported by the "facts" or interpretations of "facts".
SOURCE:	Think Big, * p. 48.
RELEVANCE:	Asking questions which require higher level thinking skills and evaluating the answers are critical steps toward problem solving and independent learning. This activity gives experience in inquiry.

From Think Big*, p. 48

"Missing on Monday"

"Solly Silver, the well-known film producer, has just completed a mystery movie, "Missing on Monday", featuring a private detective named Monica Zims.

The kidnapping takes place on Monday, September 28th. The victim is Mando Martinez, a popular Mexican folk singer. When Detective Zims arrives on the scene (Mando's oceanfront house), she discovers the following:

Mando has been kidnapped. A door leading to the beach is unlocked. Outside in the wet sand, two size-8 footprints are visible. A woman's pearl earring is on the floor, and there are two cups half-filled with coffee on the table. A partially burned page from a Mexico City newspaper is still smoldering in the fireplace. Neighbors report hearing two shouts at 11:45 p.m., followed by the roar of a boat's outboard motor.

Just before he disappeared, Mando attempted to leave a clue to his kidnapper and left the following message scrawled in the sand: CASA.

Detective Zims is questioning the suspects. They are:

Salty O'Hara (a local fisherman)
Casandra Finch (Mando's former girl friend)
Lenny House (Mando's agent)
Ramon Casady (a newspaper reporter from Mexico)

If you were the detective, what questions would you ask these suspects? Write your questions.

Who do you think kidnapped Mando Martinez?

CREATIVE PROBLEM SOLVING - I, II
LANGUAGE ARTS, SOCIAL STUDIES

OBJECTIVES: To develop an understanding of the component parts of a complex problem
To plan a project effectively

MOTIVATION: "Remember when people were buying PET ROCKS? What are some of the reasons people bought these inanimate objects? How did the sellers convince so many people to buy these? What are the expenses involved in selling this type of object?"

ACTIVITY: Brainstorm a list of inanimate objects which might have the appeal of a Pet Rock. (stick, shell, rope, bone....) Decide what a company would have to do to market Pet _______s. Form a production company to plan this product. Members will have to plan design, packaging, advertising, and other relevant aspects.

FOLLOW-UP: Plan a display of Pet _____s for others in the class or school. Develop model of the Pet, advertise, write commercials, gather some product evaluation data from those attending.

SOURCE: Think Big*, p. 23.

RELEVANCE: Students need activities which require comprehensive planning. This activity requires analysis of the many sub-problems to be solved and synthesized into a coordinated whole.

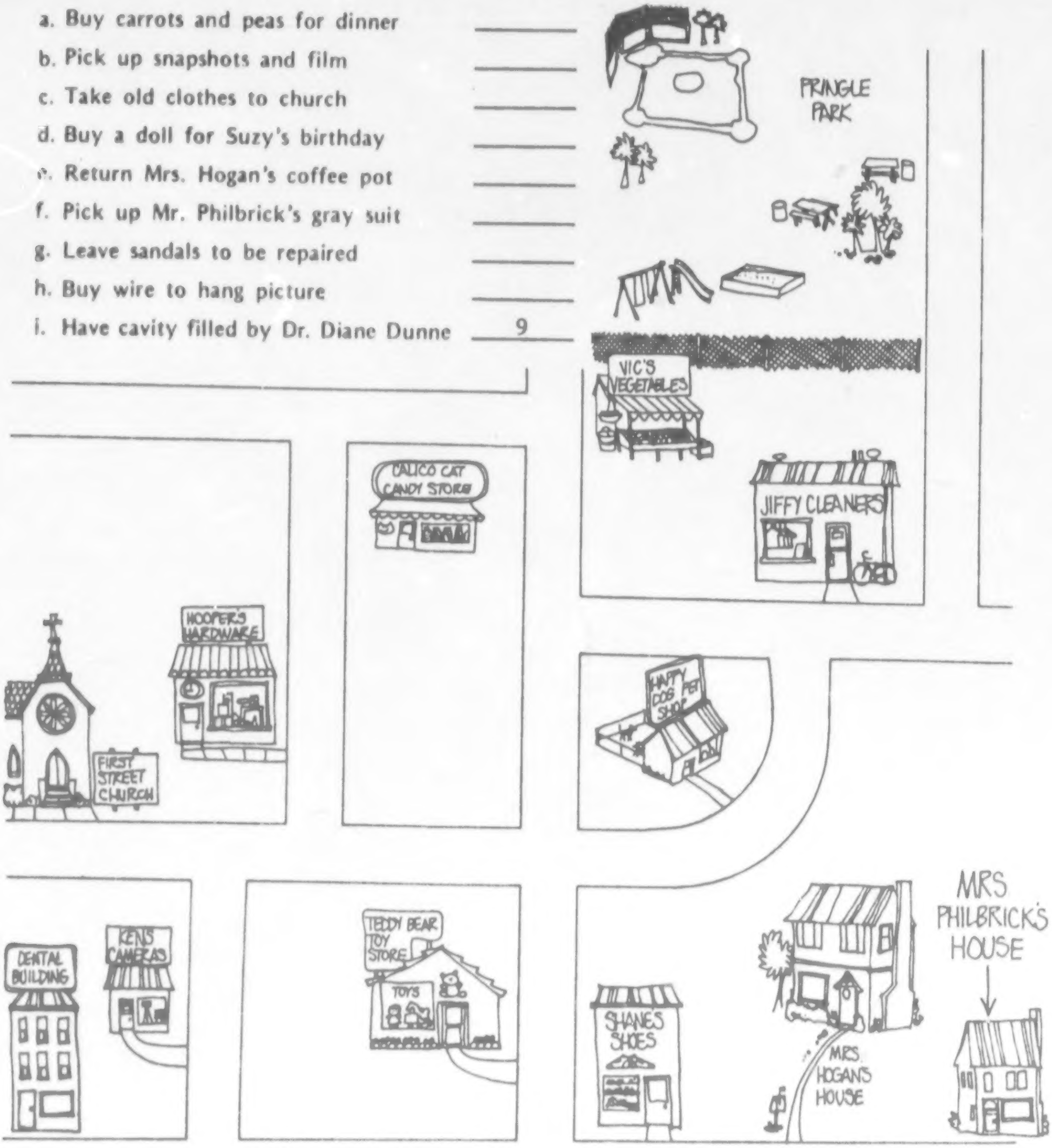
OBJECTIVES:	To generate many possible solutions To provide opportunities to evaluate alternatives and select the most efficient
MOTIVATION:	Brainstorm a list of possible Saturday chores. Discuss how students decide on the order in which to complete them. What are some of the considerations likely to enter into the decisions? (time, proximity, etc.)
ACTIVITY:	Students read the story of Mrs. Philbrick's errands and decide the most efficient way for her to proceed.
FOLLOW-UP:	Students may wish to write this type of problem on their own. A variation on the situation is to have students find the longest way for Mrs. Philbrick to complete her errands.
SOURCE:	Think Big,* p. 61.
RELEVANCE:	Able students need opportunites to develop fluency and flexibility and converge on the best response or solution.

EFFICIENT MRS. PHILBRICK

One morning Mrs. Philbrick had a lot of errands to do. She wanted to do her errands quickly because she had a dentist appointment at 10:30. She also wanted to use as little gas as possible. So she planned her route carefully.

Here is a list of Mrs. Philbrick's errands. Number them in the order that she did them. Then draw a line on the map to show Mrs. Philbrick's route.

a. Buy carrots and peas for dinner ______
b. Pick up snapshots and film ______
c. Take old clothes to church ______
d. Buy a doll for Suzy's birthday ______
e. Return Mrs. Hogan's coffee pot ______
f. Pick up Mr. Philbrick's gray suit ______
g. Leave sandals to be repaired ______
h. Buy wire to hang picture ______
i. Have cavity filled by Dr. Diane Dunne __9__


PRINGLE PARK
VIC'S VEGETABLES
JIFFY CLEANERS
CALICO CAT CANDY STORE
HOOPER'S HARDWARE
FIRST STREET CHURCH
HAPPY DOG PET SHOP
DENTAL BUILDING
KEN'S CAMERAS
TEDDY BEAR TOY STORE
TOYS
SHANE'S SHOES
MRS. HOGAN'S HOUSE
MRS PHILBRICK'S HOUSE

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OBJECTIVES: To introduce a technique which may be applied in the creative problem solving process

MOTIVATION: Elicit from the students 10 nouns which are then written on the board. (do not allow proper nouns)

Have a volunteer select two nouns ar random and force a relationship between them. An example may be found in I Believe in Unicorns (skate-plate). Ask questions such as "How could you use a skate plate?" Students should be discouraged from selecting nouns which already relate (ball and bat).

ACTIVITY: Distribute the activity "Slicky-Sticky" from I Believe in Unicorns. The students relate two nouns, draw the result, and write a description of their forced relationship.

FOLLOW-UP: Students contribute nouns to a "think tank" which may be made from a fish bowl or another large container. These random nouns can be drawn out of the tank by students during problem solving in order to spur ideas or open the idea finding phase of creative problem solving.

SOURCE: I Believe in Unicorns*

RELEVANCE: Able students benefit from opportunities to think creatively. This activity also provides students with a technique for creative problem solving.

CREATIVE PROBLEM SOLVING - II
LANGUAGE ARTS

OBJECTIVES:
To develop inquiry skills
To provide opportunities to evaluate facts and draw conclusions
To encourage students to cite evidence to support conclusions

MOTIVATION:
Write clues on board before the activity (see next page).
Read "The Shaggy Dog Crime" to the students.

ACTIVITY:
Students ask questions in order to clarify the situation.
Write conclusions based on the evidence; decide whether Mrs. Walker is lying or telling the truth. The conclusion must be supported by evidence from the clues.

FOLLOW-UP:
After writing conclusions and sharing them with the group, students might reverse their stands and write or tell their conclusions supporting their new views.

SOURCE:
Think Big,* p. 60.

RELEVANCE:
Either position is defensible. This activity forces students to weigh the two sides of an issue, form an opinion, and defend it with evidence. This resembles many real life situations and gives able students practice in asking questions and evaluating solutions.

From Think Big*, p. 60

"The Shaggy Dog Crime"

"One rainy night, a shaggy black sheepdog was stolen from the backyard of Mr. and Mrs. Victor Cornish, who lived in Midville. Inspector Inkle suspected that the dognapper was Mrs. Laura Walker, a sweet, gray-haired lady who lived alone in Valley City, five miles from Midville. The day after the crime, Inspector Inkle questioned Mrs. Walker. This is what she said:

'I did not go out at all yesterday because I had a very bad cold. I ate some vegetable soup for dinner and then I watched David Thornley of the BBS Evening News. I made a batch of cookies and knit a pink sweater for my graddaughter's doll. Then I cleaned out a drawer in the kitchen. By that time I was tired, so I went to bed. I do not go out alone at night. I have never owned a dog.'

Searching carefully through Mrs. Walker's house, Inspector Inkle found the following items:

some faded old recipes in the wastebasket
an empty vegetable soup can
scraps of pink yarn
a damp umbrella
three dozen molasses cookies
four long black hairs
a map of Midville
a bottle of cough medicine
a newspaper picture of David Thornley
one ticket to a Saturday night concert.

Do you think Mrs. Walker was telling the truth? Why? Why not? In a paragraph, explain your answer using the items that Inspector Inkle found."

CREATIVE PROBLEM SOLVING -II
MATH

OBJECTIVES:	To encourage deductive thinking skills To develop effective techniques for problem solving
MOTIVATION:	Talk about how detectives solve mysteries. Discuss the importance of clues; both direct and indirect. Talk about logical conclusions and the importance of avoiding unfounded assumptions.
ACTIVITY:	Present the technique for charting information (Deductive Thinking Skills). The Mind Bender books present increasingly more difficult problems for the students to solve. Initially, these are done by the group so that students can help each other.
FOLLOW-UP:	Students may wish to continue doing the more advanced deductive thinking problems on their own. Students may develop their own Mind Benders, complete with charts and clues, to share with others.
SOURCE:	Deductive Thinking Skills Mind Benders *.
RELEVANCE:	Able students need to be challenged to organize their thoughts, to systematically approach complex problems.

MIND BENDER

by Nicole M. Grade 4

Susan, Scott, Cindy, and Vincent got their report cards. Each child looked to see who their teacher was going to be next year. Try to find out whose teacher is whose. (Mrs. Myer, Mrs. Brown, Mrs. Hood, and Mrs. Kuebler)

1. Susan's teacher doesn't have a m in the beginning of her last name.
2. Cindy's teacher is not the teacher with the longest name.
3. The last person in alphabetical order by first name has the last teacher in alphabetical order by the last name.
4. Cindy doesn't have the teacher with a b in the beginning of her last name.
5. Scott got the teacher with eight letters including the Mrs. part and the last name.

	Mrs. M.	Mrs. K.	Mrs. B.	Mrs. H
Susan				
Scott				
Cindy				
Vincent				

LANGUAGE ARTS - II
CREATIVE PROBLEM SOLVING
SCIENCE

OBJECTIVE: To introduce a technique for creative problem solving

MOTIVATION: "Here is a fool proof idea-invention-finding scheme."

ACTIVITY: List the attributes of the situation. Below each attribute, place as many alternatives as you can think of. (Use brainstorming.) Then make many random runs across the lists of alternatives, picking up a different one from each column and assembling the combinations into entirely new forms of your original subject.

Example:
Subject: Improve a ball-point pen

Attributes:

Form	Material	Cap Detail	Ink Cartridge
cylindrical	[✓ plastic]	separate cap	steel
faceted	metal	attached cap	[✓ plastic]
[✓ square]	paper	[✓ no cap]	permanent
beaded	wood	retracts	paper
sculptured	glass	cleaning	ink

Invention: A Cube Pen: one corner writes leaving six faces for ads, calendars, photos, etc.

FOLLOW-UP: Try to invent a new kind of screw driver or sandwich spread.

SOURCE: Koberg and Bagnall, The Universal Traveler, William Kaufmann Inc. pp. 53 & 72.

RELEVANCE: This activity encourages creative group problem solving.

FORCED CONNECTIONS

SUBJECTS:

ATTRIBUTES:

INVENTION:

OBJECTIVES:

To encourage question-asking
To develop deductive thinking skills
To develop effective techniques for problem solving

MOTIVATION:

"I'm thinking of a famous person. You have 20 questions to guess who it is. Your questions must be answerable by yes or no."

ACTIVITY:

As students ask questions, record them on the board or on a transparency.

Following the round, go over the questions with the group determining which questions could have been asked differently in order to gain more information, what kinds of questions would allow the askers to eliminate large numbers of the population, how questions could be combined, which questions were redundant or irrelevant.

FOLLOW-UP:

Repeat the activity with a different person in mind. Ask students to re-evaluate their question-asking strategy using the information and criteria established previously.

SOURCE:

Mark Lago, PACE teacher

RELEVANCE:

Able students need to learn to ask more effective questions. They need to learn to evaluate what is known, what is unknown, and how best to obtain the unknown information. This activity teaches a systematic approach to questioning.

CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To increase understanding of creative problem solving as a process
To relate problem solving to inventors and inventions

MOTIVATION: "What are some inventions that we use today?"
List the inventions on the board.
"What problems did each of these inventions solve?"
After each invention write the problem phrased as a question.

ACTIVITY: Ask students to attempt to define Creative Problem Solving, using previous knowledge. If necessary, explain that CPS is a process for arriving at unique solutions to problems that face us. These problems may be as everyday as keeping litter off the playground or as complex as solving the energy crisis.

Discuss various inventors and the problems they faced and solved. Suggested inventors: The Wright Brothers, Edison, The Curies, Henry Ford, and Eli Whitney. Biographies of numerous inventors can be found in most school libraries.

Create a timeline of inventions which have had a significant impact on our world.

FOLLOW-UP: Discuss the types of problems which are present today and which could be solved by inventions. Use the list as a resource for specific CPS techniques such as synectics, (see p. 165) attribute listing (see p. 190) or SCAMPER (see p. 165).

SOURCE: Mark Lago, PACE teacher

RELEVANCE: It is expected that among our able students there are future inventors and leaders. The problem solving methods may be applied to large and small problems. This activity may motivate them to see themselves as problem solvers.

CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To develop an awareness of the components of a problem
To encourage creative thinking and production

MOTIVATION: "What is an attribute?" Explain that an attribute is a characteristic or property of a person, object, or idea. Using students as examples, illustrate physical and personality attributes. Using a concrete object, illustrate the varied properties such as color, size, texture, etc.

Explain that one technique of creative problem solving is attribute listing. This technique consists of breaking the problem situation into its component parts and looking at each part as a possible area for modification or solution.

ACTIVITY: Select a problem. This may be done by having students brainstorm problem situations in the school or community. Break the problem into the component parts.
List the attributes of each part.
Suggest possible solutions or modifications of each part.
The following chart may be used as an example of the process and the use of charts to record the information.

HOW CAN WE IMPROVE SCHOOL PRIDE?

Parts or Components	Attributes or Characteristics	Possible Solution
School spirit	Support at games and school programs	Award to largest % of class in attendance
Litter	Paper, cans, ring tops, candy wrappers	Clean-up and no litter campaign
Discipline	Misbehavior at games and programs	Student leaders discuss problems with peers
Enthusiasm for school	Negative comments about school, teachers, etc.	School T-shirts, folders, and notebooks.

FOLLOW-UP: Using the chart, students write a comprehensive solution to the problem. Elaborate on the proposed solution. Share with group and, if appropriate, others in the school.

Note: This activity is more effective if it is presented over the course of several class meetings.

SOURCE: Mark Lago, PACE teacher

RELEVANCE: It is important for able students to examine a problem and its parts in order to develop possible solutions. Able students need to have many techniques at hand for creative problem solving.

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CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To develop within the students a "problem awareness"
To illustrate the role of Creative Problem Solving in society

MOTIVATION: "Imagine that you had lived one hundred years ago. What was your life like?"

ACTIVITY: "Think of the problems you might have faced. Let's list as many as we can."

"Which of these problems have been solved in the last one hundred years? How were they solved and what were the solutions? Which problems have not been solved? Why do you think there are no solutions to these problems yet? Are there any problems which have been created because of solutions to other problems?" (i.e. pollution due to car exhaust)

"What things do we need to consider as we develop creative solutions to our problems? How do we know if the positive results outweigh the negative results?" Develop a list of criteria for evaluation of solutions to problems.

FOLLOW-UP: This lesson can be extended by doing a similar activity using any of the following questions:

"What are the problems we face now which we did not face one hundred years ago?
What problems will we face in one hundred years which we do not face now?
Which problems of today do you think will be solved in one hundred years?"

SOURCE: Mark Lago, PACE teacher

RELEVANCE: Many educators believe that the able students of today will be the political, economical, and scientific leaders of the future. Because of this, they must learn not only how to recognize and solve problems, but to anticipate the negative results of the solutions to those problems. This activity encourages students to look at problems, their solutions, and their negative results. It also encourages them to evaluate those solutions in relation to their negative results.

CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To introduce a technique for problem solving
To promote flexible thinking

MOTIVATION: Write SYNECTICS on the board.
Explain that synectics is a method of solving problems which uses analogy, or the relationship between objects or ideas, to approach a problem.

Explain that synectics is a technique frequently used in industry to develop or improve products.

Explain that synectics attempts to take familiar objects and make them unusual, and also to make unusual objects familiar.

ACTIVITY: Select a problem which the students can relate to, such as "How might we improve the telephone?" or "How could we make school a better place to learn?"

Introduce fantasy analogy. Students are to look at the problem and come up with unusual, far out, imaginative suggestions. They are encouraged not to restrict their thinking to realistic or practical solutions at this time. Fantasy ideas often lead to more realistic solutions when they are evaluated later.

Introduce personal analogy. Students place themselves directly into the problem. For example, they might ask "If I were a school, how could I become a better place to learn?" Or "If I were a telephone, how could I do a better job for people?" Students make suggestions for solutions from this point of view.

Introduce direct analogy. Students are to look at related ideas or objects seeking ideas which could directly relate to the problem under consideration. "How do public libraries provide better opportunities to learn? hospitals? other institutions?" "What are some ways computers provide better means of communication? satellites? radios?"

FOLLOW-UP: Students look at the results of their fantasy, personal, and direct analogies for ideas worth pursuing or synthesizing into a solution.

SOURCE: Mark Lago, PACE teacher

RELEVANCE: Students need to be able to look at problems from different points of view. Flexibility in thinking gives able students another tool for effective problem solving.

OBJECTIVES:

To sharpen deductive reasoning
To promote interest in mysteries

MOTIVATION:

Present one of the simple deductive thinking skills in Mind Benders. Discuss the use of clues and available information to solve a puzzle.

ACTIVITY:

Talk about the use of inductive and deductive reasoning in mysteries. Use a dictionary or other resources to define inductive and deductive reasoning.

Give examples of the use of inductive and deductive reasoning from literature or television programs.

Have students look for examples in their reading and viewing.

FOLLOW-UP:

This activity may be used to initiate a unit on mysteries and to introduce ways in which a sleuth uses inductive and deductive reasoning.

Students may create their own mind benders.

SOURCE:

Mind Benders*

Inductive Thinking Skills*

RELEVANCE:

Able students enjoy discussing and defining specific thought processes and thinking skills. It is important to make them more aware of the actual thought processes involved in logical thinking. Challenging mental exercises are appropriate and enjoyable to most able students.

OBJECTIVES: To set the stage for solving mysteries
To foster analysis, synthesis, and evaluation skills

MOTIVATION: Read orally a selection from one of the books listed below. Encourage students to listen for clues, decide what information is pertinent, use their deductive and inductive reasoning abilities, and come up with a proposed solution.

ACTIVITY: Discuss the proposed solution. Evaluate the evidence and select the correct solution.

Give students copies of several of the short selections and allow them to work individually to solve the mystery. After they have determined individual solutions, let them work in pairs and compare solutions.

FOLLOW-UP: Students can bring in mysteries they have found in their reading.
Some students may be motivated to create their own "minute mystery".

SOURCE:

Two-Minute Mysteries Donald Sobol
More Two-Minute Mysteries Donald Sobol
Minute Mysteries Austin Ripley
Encyclopedia Brown Donald Sobol
The Face at the Window*

RELEVANCE: Able students are challenged by activities which require them to gather and synthesize information and arrive at a solution through logiacal thinking.

CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To sharpen deductive reasoning
To develop appreciation of the classic mystery
To increase vocabulary

MOTIVATION: A short biography of A.C. Doyle is presented, along with the background of his characters, Sherlock Holmes and Dr. Watson. The setting for the stories may also be described.

ACTIVITY: Students may read, independently, one of the Sherlock Holmes mysteries. The Hound of the Baskervilles is an appropriate book-length selection. Better readers may choose the short story "The Red-Headed League" or other short stories by Doyle. Tapes of these stories are available and may be interspersed with the independent reading. Students should read and listen for clues, characterizations, and vocabulary.

FOLLOW-UP: Students continue reading other Sherlock Holmes stories on their own. They may wish to present one to the group, giving appropriate clues and allowing classmates to "solve" the mystery. Role-playing of characters from the stories is encouraged.

SOURCE: Valerie Montgomery, PACE teacher

RELEVANCE: Students are challenged by the plots, vocabulary, and intricacies of the Sherlock Holmes stories. They are attracted by the brillance of the characters. Bright people like to read about intelligent people.

OBJECTIVES: To present basic thinking processes and definitions
To elicit the attributes of a good detective

MOTIVATION: A large deerstalker hat as worn by Sherlock Holmes can be made from construction paper and placed on the bulletin board.

Students list some of the attributes of a good detective (such as courage, decisiveness, dedication, perserverance, ambition). These are written on the cut-out hat which becomes the "brain of Sherlock Holmes".

ACTIVITY: As the unit on mysteries progresses, students continue to search for characteristics and attributes of good detectives which are added to the "hat".

Terminology is introduced and defined with students looking for examples of the various types of thinking in their reading (inductive reasoning, deductive reasoning, analysis, synthesis, evaluation, critical thinking).

Examples are discussed in small group sessions.

FOLLOW-UP: Students locate newspaper accounts of criminal investigations which exemplify the characteristics of detective work.

SOURCE: Valerie Montgomery, PACE teacher

RELEVANCE: In order to become good thinkers, students should be aware of the components of critical thinking.

OBJECTIVES: To develop flexibility and originality
To introduce encoding and decoding

MOTIVATION: Present an example of an easy code and ask students to determine the message.

ACTIVITY: Present the codes on the next page. Have students decode and encode messages using these or their own codes.

Decode the map on the following page.

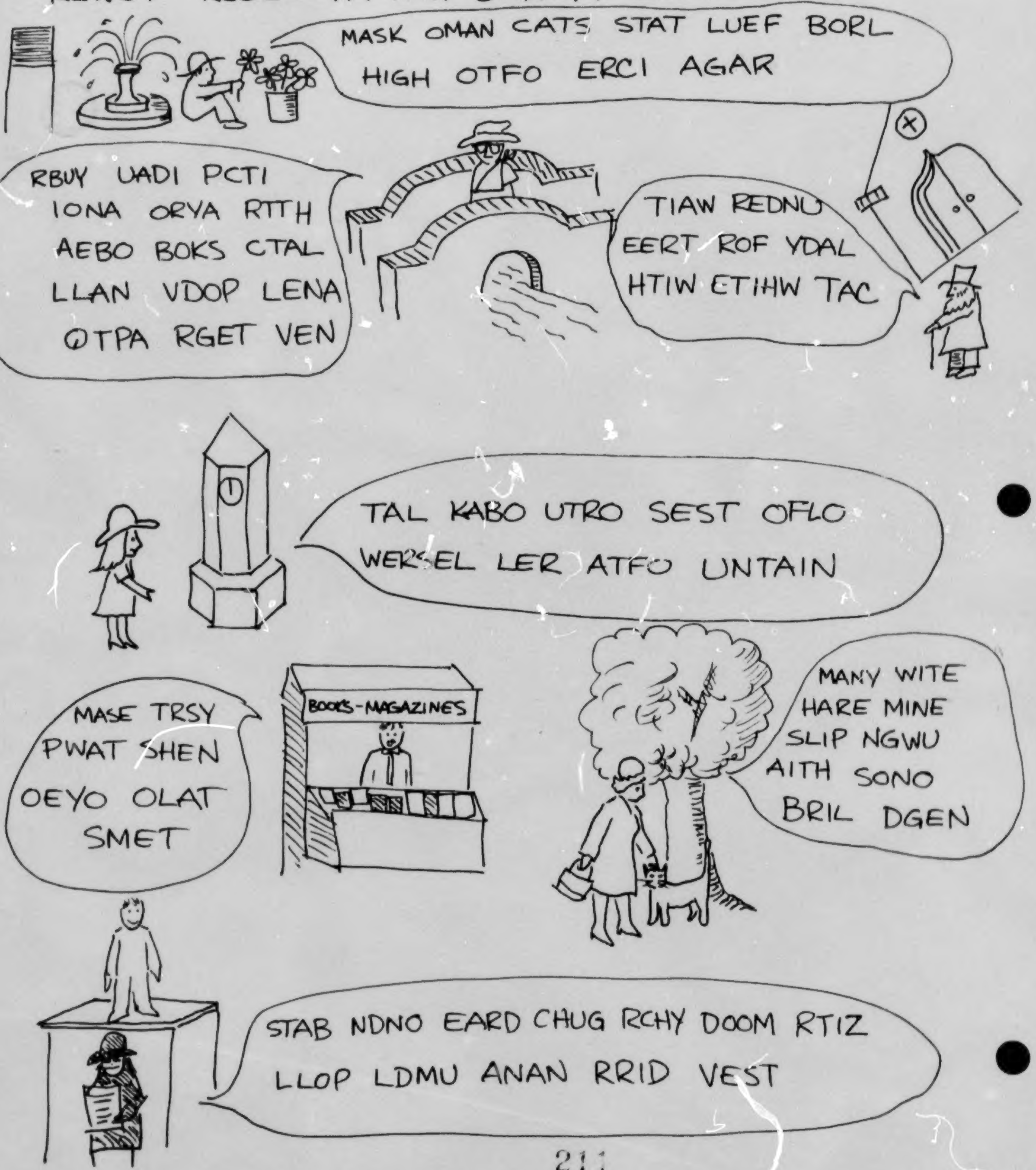
FOLLOW-UP: Investigate various types of codes: military, diplomatic, codes in literature (such as Poe's "The Gold Bug").

SOURCE: The Know How Book of Codes, Secret Agents, and Spies*

RELEVANCE: Able students should have challenging and stimulating activities which require problem solving and trial and error. Able students enjoy puzzling activities and the opportunity to create their own challenges.

FIND THE "MASTER SPY".

REWOT KCOLC TA TAH DER NI LRIG TEEM


MASK OMAN CATS STAT LUEF BORL HIGH OTFO ERCI AGAR
RBUY UADI PCTI IONA ORYA RTTH AEBO BOKS CTAL LLAN VDOP LENA QTPA RGET VEN
TIAW REDNU EERT ROF YDAL HTIW ETIHW TAC
TAL KABO UTRO SEST OFLO WERSEL LER ATFO UNTAIN
BOOKS-MAGAZINES
MASE TRSY PWAT SHEN OEYO OLAT SMET
MANY WITE HARE MINE SLIP NGWU AITH SONO BRIL DGEN
STAB NDNO EARD CHUG RCHY DOOM RTIZ LLOP LDMU ANAN RRID VEST

QUICK CODES

1. Word split

WE/T RAIL/S PIES

2. Backwards words

EW LIART SEIPS

3. Backwards sentences

SEIPS LIART EW

4. Dummy first letter

~~A~~WET ~~G~~RAI ~~E~~LSP ~~T~~IES

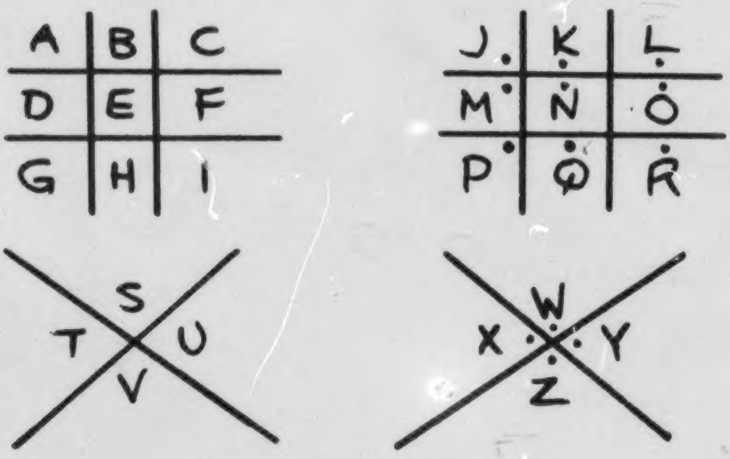
5. Dummy last letter

WET~~H~~ RAI~~O~~ LSP~~A~~ IES~~T~~

6. Exchanged letters

WETA RILP SIES

PIG-PEN CODE


A B C
D E F
G H I
J K L
M N O
P Q R
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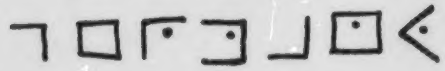
Example:  = Germany

OBJECTIVE: To relate artistic creativity and literature

MOTIVATION: Present several book jackets from mystery stories. Have students discuss the elements of the cover design:

> What parts of the story are portrayed?
> Are any symbols used which represent the characters, clues, or parts of the story?

ACTIVITY: Students select a mystery story or book they have read and design a book jacket.

FOLLOW-UP: Display the designs.
Have students establish evaluation criteria and evaluate their own design.

SOURCE: Valerie Montgomery, PACE teacher

RELEVANCE: Able students need opportunities to integrate academic content and creative expression. This lesson gives them an opportunity to graphically represent literary content.

OBJECTIVES: To expand vocabulary
To promote the understanding of the origins of words in our language or other languages

MOTIVATION: Select several unusual words from the Sherlock Holmes stories (red herring, masquerade, sleuth, clue, detective).
Ask students to hypothesize possible origins of these words or expressions.
Present the word ETYMOLOGY. Use a dictionary to define it.

ACTIVITY: Locate other words in the various stories. Have students bring in the words they encounter when reading these stories.

Check the origins in the dictionary or a reference book on the origins of words and expressions.

FOLLOW-UP: Students may make a dictionary of mystery words. Illustrations could be included.

Those who are motivated to do so could write their own mystery story using these words and expressions.

SOURCE: Valerie Montgomery, PACE teacher

RELEVANCE: Able students generally have large vocabularies and enjoy adding to them. Many students are intrigued by the derivations of words and will even pursue this study on their own.

CREATIVE PROBLEM SOLVING - II

OBJECTIVES: To enrich the study of mysteries
To develop question-asking skills

MOTIVATION: "What questions would you like to ask an expert on Sherlock Holmes?"

ACTIVITY: A member of the "Baker Street Irregulars" is invited to visit the class. This organization is comprised of people who share an interest in the work of Arthur Conan Doyle and in the characters of Sherlock Holmes and Dr. Watson. There are a number of local chapters of this organization and one may be located by contacting a public library or a nearby college or university (check with the English Department).

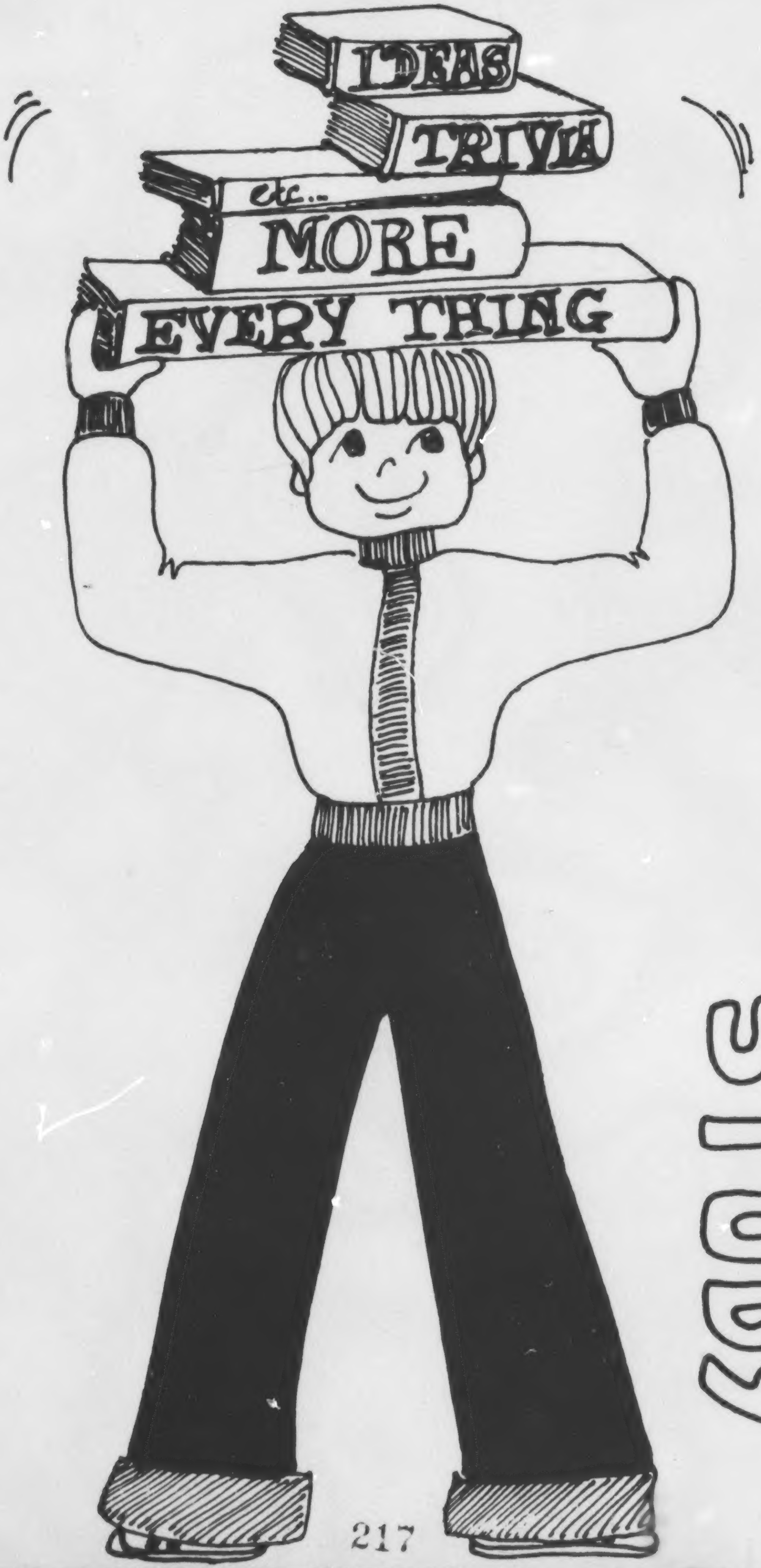
Resource people from this organization are likely to bring memorabilia, share anecdotes about Sherlock Holmes and other characters, discuss their favorite stories, and tell about the activities of the group.

FOLLOW-UP: Students who find this interesting may want to read recent books which have been written about Holmes and Watson and which purport to present more recent "findings" about these characters. West-end Horror and Seven Percent Solution, both by Meyer, are examples of these types of books. Note: The content of these books includes drug addiction and other mature themes.

SOURCE: Valerie Montgomery, PACE teacher

RELEVANCE: Many students are fascinated by the Holmes stories. An expert in this area may serve as a positive role model, showing these students that their interests may extend into their adult years and allow them a stimulating experience relating to others who share their interests.

INDEPENDENT STUDY


IDEAS
TRIVIA
etc...
MORE
EVERY THING

INDEPENDENT STUDY

Independent study is the third stage of the Three Stage Model. In this stage students exercise self-motivation and direction and synthesize their ideas into creative project activities. Students learn positive attitudes toward the learning process, self-confidence and facts which will ultimately enhance higher levels of thinking.

Students work individually or in small groups. They set realistic goals, gather information, and develop a product. The teacher acts as a resource person who lends aid, guides, and insists on quality work.

We recommend that teachers follow a series of steps to provide structure for independent study and to facilitate successful completion of individual projects. These are as follows:

1. Developing Basic Skills
2. Structuring the Independent Study
3. Selecting the Topic
4. Developing the Questions
5. Contracting and Pacing
6. Choosing Resources and Researching
7. Displaying and Sharing the Product
8. Evaluating the Independent Study.

Among the basic skills to develop are note-taking, outlining interviewing techniques, telephone protocol, letter writing, library skills and research techniques. These skills may be developed over a period of time beginning with the rudiments in the third grade and progressing to more sophisticated skills in the older students. These skills may be taught prior to or concurrently with Independent Study.

For students with limited exposure to indepth Independent Study we suggest two approaches to provide structure: theme-centered inquiry and research methodology. The role of the teacher varies with the level of sophistication of the students and the amount of previous exposure to individualized projects.

Teacher and/or student selection of classic children's literature or a broad topic such as aerodynamics or pollution may serve as a base which leads to an interdisciplinary approach of theme-centered inquiry in Independent Study. Students for whom Independent Study is a new experience may find that the theme-led approach facilitates the process and familiarizes them with the techniques involved.

The Research Methodology approach is based on the teacher-developed activities found in Up Periscope*. Up Periscope introduces students to concepts in scientific and social science research. Students learn to formulate hypotheses, collect and analyze data, and report results in graphic and written form. Through sample research activities, students learn to conceptualize and carry out experimental, quasi-experimental, correlational, case study, historical, developmental, descriptive and action research. Once introduced to the various types of research, students may design and carry out their own studies independently or in small groups.

Both the theme-centered and research methodology approaches to independent study are useful for providing students with a basis for developing questions and pursuing topics of interest. We stress, however, that some students may not require this kind of guidance. Students who have a topic in mind and the basic skills to proceed should be allowed to do so.

In order to assist students in Independent Study, teachers should refer to resources in the bibliography for specific suggestions and activities on selecting the topic and subsequent steps in the independent study process. Examples of resources helpful in Independent Study are:

Asking Questions, Finding Answers * (Draze, 1979)
Big Book of Independent Study (Kaplan, Madsen, Gould, Goodyear, Pacific Palisades CA, 1976)
"Interest-A-Lyzer" (Renzulli, 1977)
It Takes Teaching: A Systematic Approach to Independent Study* (Dallas Independent School District, 1980)
Self-Starter Kit For Independent Study* (Doherty, Evans, 1980)
The Investigation of Real Problems* (Vezza, Bagley, 1979)
To Teach For Thinking* (Dallas Independent School District, 1977)
Up Periscope* (Dallas Independent School District, 1977)

SAMPLE CONTRACT

PROJECT CONTRACT FOR ____________________ Enrichment Program

SUBJECT:

DESCRIPTION:

MATERIALS NEEDED:

PRESENTATION:

COMPLETION DATE:

Signed ____________________

Teacher ____________________

SAMPLE CONTRACT

MY INDEPENDENT PROJECT

________________ Name

Title: ____

A brief explanation of my project: ____________________

____

Some questions I want to answer: ____________________

____

____

Materials needed: ____________________________________

____

____

Resources: books, encyclopedias, people, and others: ____________

____

____

Ideas for sharing my project: ________________________

____

____

Estimation of time: ___________________________________

Date started: ____

Date completed: ______________________________________

Steps I will take:

Step 1 ____

Step 2 ____

Step 3 ____

Step 4 ____

Step 5 ____

Final Description

Signature ______________________________

EXAMPLE OF A LETTER TO PARENTS INFORMING THEM OF AN INDEPENDENT PROJECT

(Several teachers found that this helps parents know what their child was doing in the class and also alerts them that the child has a project due on a certain date.)

Dear Parents:

____________________ has selected an individual project on ______________________________ for sharing with the enrichment class. Your student has selected ____________________________ as the date to share the project with the class.

Sincerely,

PACE Teacher

INDEPENDENT STUDY TOPICS - PACE

STAGE III - February - April, 1980

Rocks-Identification & Discussion
Candles
Animal Medicine
Archaeology
Geology
Newspaper during the Civil War
Magazine during the Civil War
Space Travel & Equipment
Presidents Grant and Lincoln
Gazelles & Cheetahs (African Animals)
Debate - Slavery Pro & Con
Harriet Tubman - Underground Railroad
Cooking
Language - Calligraphy
Rockets
Planets
Children's Classics
Sulky Racing
Geneology
Famous Marines
A Play from a Fairy Tale
How to Show Horses
Quarterhorses
Fiddling
Geology
Art
Breeds of Calves
Drawing Horses
A Day in the Lab
Space Travel - An Apollo Mission
Maps - How they're designed and made
Solar System
Gymnastics
Dolls
Snakes
Stamps
Astronauts
Dinosaurs
A School Newspaper
Morse Code Emitter
Sew & Show
Garden in a Dish
Indian Picture Writing
Jet Propulsion
My Future
Afghanistan
Reading & Library Skills
Ty Cobb
Norman Rockwell
Arabian Horses
Albert Einstein
A Collage about My Father
Alaska-Effects of the Pipeline on Ecology
Robert Frost-Poetry Interpretation
The Gold Rush
F.D. Roosevelt
Jackie Robinson - Blacks & Athletics
Middle Ages: Making a full set of armor
  Weapon - Making
  Shields - Heraldry
  "Dungeons & Dragons"
Snakes: Puppets
  Myths
  Sizes and Kinds
Inventions
Active Winter Animals
Baby Rabbits
Planets
Bear, Deer, Squirrel & Wolf
German
My Beautiful Butterflies
Acting out Poems
Dogs
A Book of Drawing
Codes
Floor Plan of my House
Learning Name Meanings
Family Tree
Future Clothing
Cartoons
Cats
Burglar Alarm
Spring Shoes
My Puppets
Sign Language & Manual Alphabet
About Brahms and Making Music
Baton Twirling
Volcanoes
Texas
Chile
Ants

INDEPENDENT PROJECTS - 2

Purdue
Military Airplanes
How to Fly an Airplane
Florida
Purdue Chicken Farm
Artillery
Houdini
Insect Anatomy
Basketball
4 - H
Psychic Phenomena - Beyond the Natural
Teeth
4 Steps of Telepathy
Endangered Species - The Fox
Grooming and Raising an Irish Setter
Basketball-Joe Barry Carroll
Ice Skating
Veterinarians
Story Telling
Cooking
Kentucky
Homemade Musical Instruments
Rhyming Poetry
School Census
Constellation
Helen Keller
Child Development
Hawaii
Panama
Nuclear Reactor at Purdue
Diesel Trucks
Drugs - Effects on the Body
Cross-Country Skiing
Snowmobiles
How to Take Care of Babies
Football - An Inside Look
Downhill Speed Skiing
The Care of Unusual House Pets
Plays (Short Ones)
Great White Sharks
Acrobatics
Ballet
Roller Disco
Steps to Solving a Mystery
Marijuana
Vaudeville
The Supernatural
Fire Engines
Penguins
Factors Affecting Plant Growth

DESCRIPTIONS OF PROJECT ACTIVITIES

Civil War Newspaper - Students researched not only the news of the day, but other types of information which would be likely to appear in a newspaper of that time. They included advertisements, social news, fashions, and editorials.

Morse Code Emitter - Two students built the emitter and demonstrated it to their small group. They duplicated the Morse Code so their classmates could translate the messages and also take a turn at sending a message. This project was also demonstrated to the entire grade level as a part of the science unit.

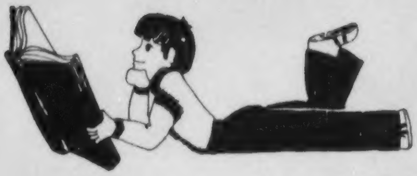
Burglar Alarm - A Student created an alarm which gives not only an auditory alarm but also has a flashing light when tripped. He used parts of an erector set, a battery, scrap wood and wire to build the project. The alarm fits in a doorway.

About Brahms - The student who selected this topic read about Brahms from several sources. Upon discovering that Brahms used to sit outside and listen to the sounds of nature, incorporating them into his music, the student did the same. He was undeterred by the fact that it was mid-February. He composed a song in Brahms style which he played for his classmates on a recorder.

Manual Alphabet - Two girls learned the manual alphabet and some simple signs. They demonstrated these to their classmates and taught phrases and a song to the group.

My Future - A third grade girl developed a picture strip which details her life from now until retirement. Included are her educational and career plans; noticeably absent is any mention of marriage and family.

Child Development - A group of fifth grade girls worked together. In addition to reading and making notebooks and posters, they spent a morning in a nursery school serving as teacher aides. While there, they taught a learning game to the children.



DESCRIPTION OF PROJECT ACTIVITIES - CONTINUED

Penguins - The student who prepared a report on penguins chose to share it with others by making a board game, similar to Monopoly. As the players move around the board, they learn facts about penguins in an amusing and stimulating way.

Basketball - Each of the three boys who worked on this project became either a coach or a player at Purdue. They planned and diagrammed plays, explained the various rules of basketball, and demonstrated the various plays. They used several books for reference, including the Sports Dictionary.

Constellations - A third grade boy wanted to learn about the stars. He read a number of references and worked through some of the activities in a kit on The Solar System. He decided to communicate what he had learned by developing a tin can planetarium. He used old tin cans and, with a hammer and nail, tapped the shape of each constellation he had studied on the end of a tin can. When the lights were out in the room, he placed a flashlight in the opening of the can and projected the constellation on the wall. To insure that his audience had learned something from this demonstration, he prepared a matching quiz which he distributed after the "lesson".

Chile - The student presented her project through use of homemade film strips and a sample of Chilean cooking.

Middle Ages - Students who worked on these projects made full sets of armor, models of weapons, and staged a mock joust outdoors during which they explained the rules for jousting, and the manner of using the weapons.

SAMPLE CONTRACT

MY INDEPENDENT PROJECT

Charlie Name

Title: About Brahms and Making Music

A brief explanation of my project: I'll do research on Brahms, then make a song

Some questions I want to answer: What was Brahms like?

Materials needed: Resource books, music paper

[✓ Resources], [✓ books], [✓ encyclopedia], people, and others:

Ideas for sharing my project: Play my song I made; tell about Brahms

Estimation of time: 2 days here, some at home

Date started: January 31, 1980

Date completed:

Steps I will take:

Step 1 Find books about Brahms

Step 2 Study the books

Step 3 Write about Brahms

Step 4 Make up a song

Step 5 Play the song

Final Description

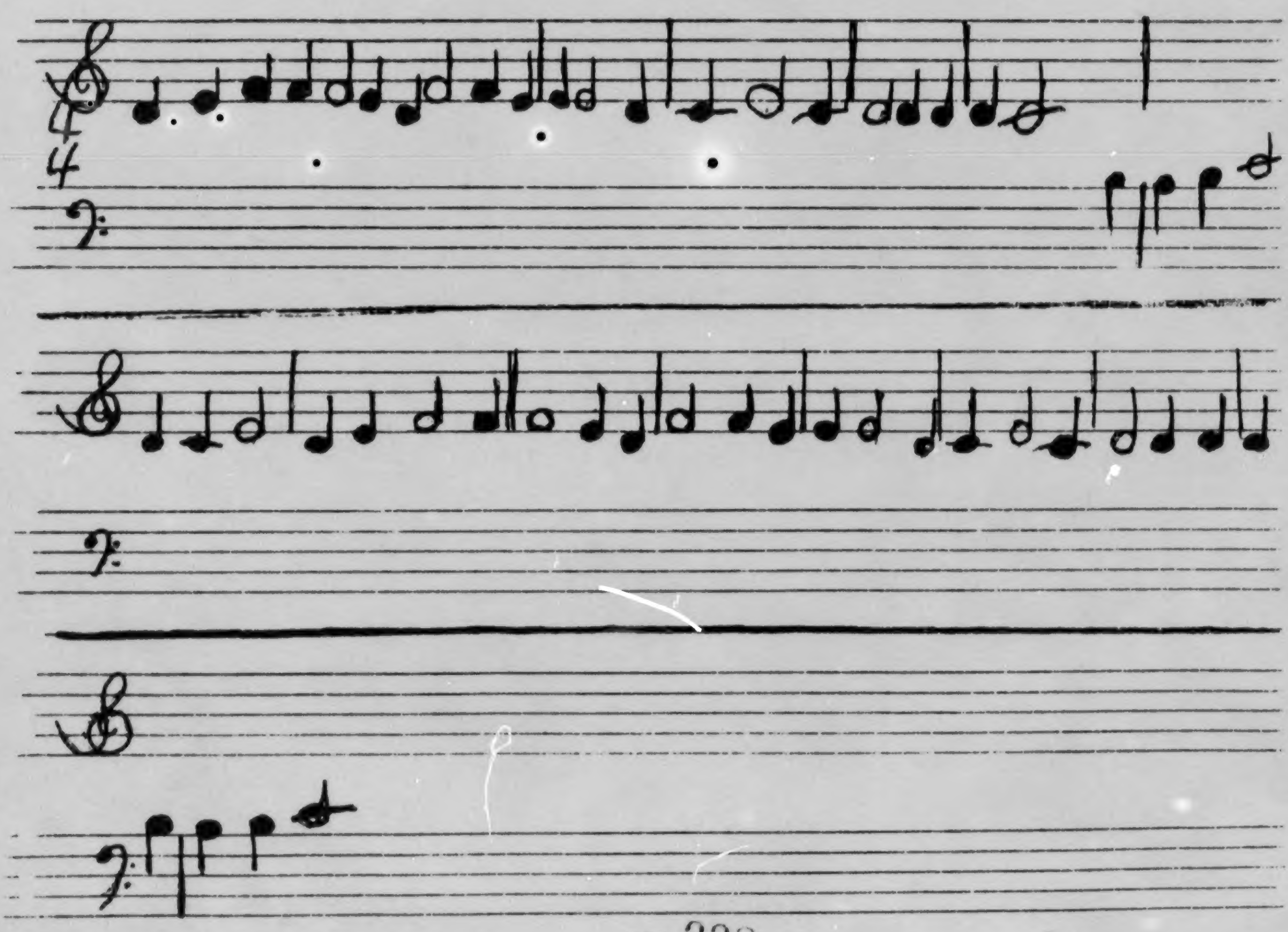
Signature

JOHANNES BRAHMS 1833-1897

Johannes Brahms was born in Hamburg of a poor family. When he was little, if he heard a tune, he could play it on his flute hearing it only once. He also, when young, could tell a piano note just by hearing it. When he was older he wrote songs. One famous song and my favorite of his was "The Cradle Song." In 1853 he went on a tour and met Joseph Joachim, a violinist. Joseph helped Brahms by introducing him to other great musicians. In 1857 to 1860 he became a teacher and conductor in Lippe-Detmold. In 1862 he visited Vienna and a year after he settled as a conductor there. Brahms never married and on April 3, 1897, he died in Vienna.

Some of Brahms songs he got from listening outside, so I did the same thing. I read about Brahms in a book and encyclopedia and wrote about him. Then I made a song up, so I went outside to think of a song like Brahms sometimes did.

Charlie F. Grade 6

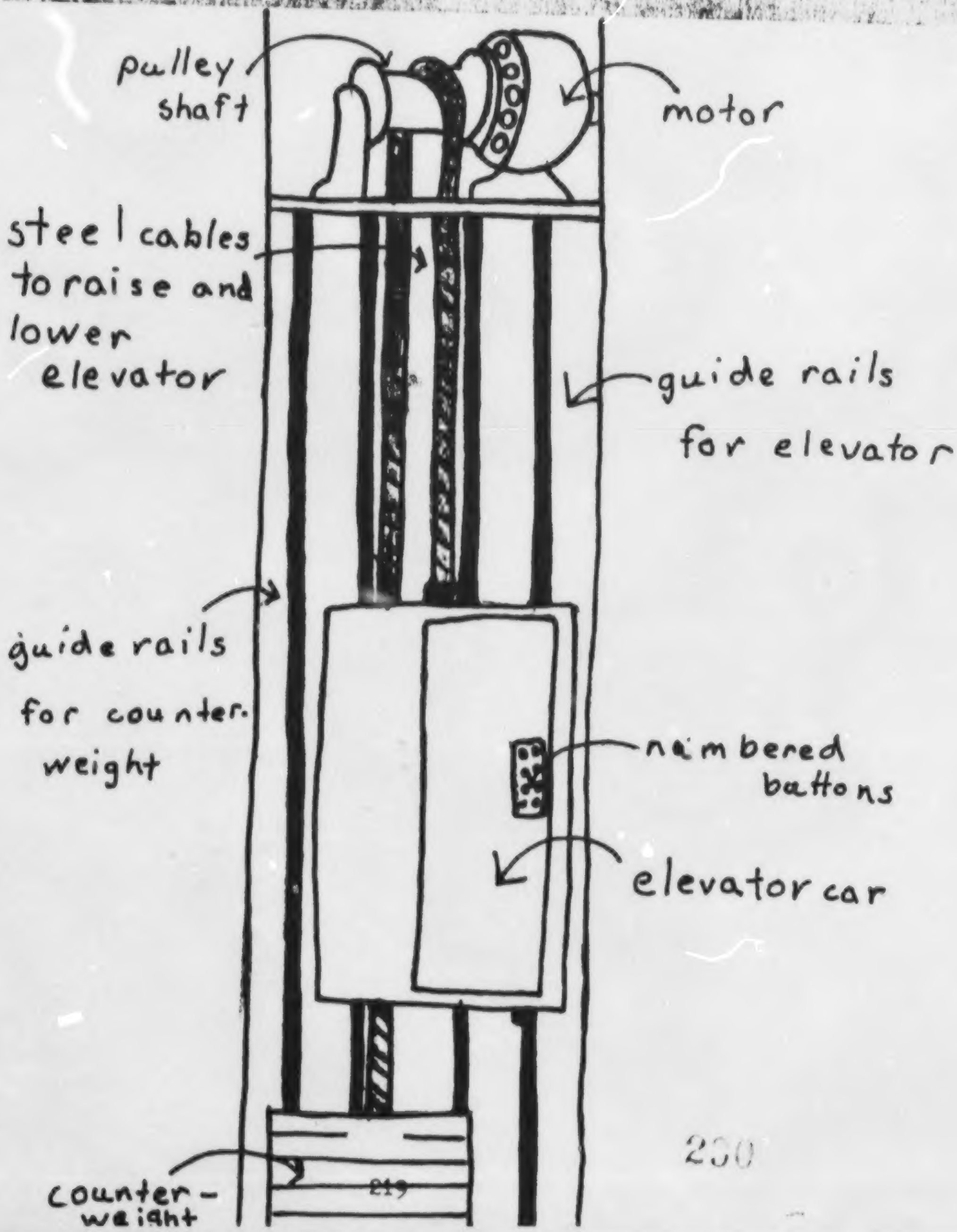


ELEVATORS

The Greeks had hand-pulled elevators by 230 a.d. They used them for storage bins. Elisha Otis is the modern inventor of the elevator. He was born August 3, 1811, in Halifax, Vermont. In 1838 he opened a manufacturing business. He closed the business in 1845. Otis invented the elevator in 1852. This elevator had a safety device. If the ropes broke, the elevator wouldn't crash to the ground. Otis demonstrated the elevator in 1854. He invented the steam-driven elevator in 1861 shortly before he died. He died April 8, 1861.

In modern elevators the car and counter-weight are raised and lowered by steel cables. Guide rails keep them in place. The counter-weight is made to weigh about the same as the car, so the motor doesn't have to lift a lot of weight. If the power goes off, the safety device keeps the car from crashing downward. The elevator led to the skyscraper by being able to go up. The details of an elevator are shown in the illustrations.

THE ELEVATOR


pulley shaft
motor
steel cables to raise and lower elevator
guide rails for elevator
guide rails for counter-weight
numbered buttons
elevator car
counter-weight

MAYFLOWER JOURNAL

Vol. 1 No. 1

Feb. 21, 1980

OLYMPIC BOYCOTT?

President Carter expects the United States Olympic Committee to consider his suggestion to boycott the Olympics in Moscow. The reason is Russia is invading Afghanistan. Unless Russia lifts its troops by Feb. 20, the American athletes might not get to compete in the summer Olympics in Moscow.

Presidential Counsel Lloyd Cutler thinks Canada, Great Britain, and West Germany will support Carter's suggestion; so there is a chance Carter's request will be accepted.

If the IOC ignores Carter's suggestion, the Olympics will be held in Moscow. The IOC is meeting in Lake Placid, New York during the Winter Olympics to discuss the problem.

The United States Olympic Committee will try to poll about 1,000 American athletes, who will hopefully be in the Olympics, to help the 86 voting members of the U.S.O.C. decide on President Carter's suggestion.

cont. Col. 2, Pg. 1

We hope everything will be straightened out by the time the Olympics start in Moscow.

By Colleen Kelly

T.V. OLYMPICS

If the Winter Olympics are your thing, you need to turn your T.V. channel to ABC. ABC promises live coverage of either ice hockey or figure skating every night. The telecasts began on Tuesday, Feb. 12 with nine colossal hours of broadcasting. Most of ABC's on the air personalities will be familiar faces. Jim McKay will again be the anchorman host.

On the other hand, if you like the Summer Olympics you will have to watch NBC. NBC has already sold over 200 million dollars

cont. Col. 1, Pg. 4

EDITORIAL

Getting News from Iran

The complicated process of getting news from Iran is getting more complicated. A few weeks ago the Iranian government ordered all American news reporters to leave the country.

Iranian newspapers and television are tightly controlled by the government. The Iranians also try to control other foreign newspapers besides America's newspapers.

American television reporters used to use Iranian television equipment to send news reports back to the United States. For speed, the news reports are transmitted from a ground system which beams the reports to a communications satellite orbiting the earth in space. The satellite beams the reports back to the U.S.A. to a receiving station. The receiving station transmitts the reports to CBS, NBC, ABC, and other television stations to broadcast on news programs.

Recently, when Iranian officials didn't like an outgoing news report, they would pull the plug out of the transmitter which beams the report to the satellite. When the Iranian government objected to a news story on CBS, they refused to let CBS news reporters use Iran's ground station facilities. Without the ground control, there was no way to get pictures from Iran to the U.S. directly.

cont. Col. 2, Pg. 2

In the last few weeks, many Iranian news reports showed widespread opposition to the leadership of Ayatolloh Khomeini. Iranian officials called these reports misleading and ordered all American news people to leave the country. In the interest of getting the news to the American public, we believe the Iranian government was wrong.

By Jaron Harmeyer

OPINION POLL****

You tell us what you think. Did the Iranian government have the right to ask U.S. reporters to leave their country?

_____YES. Why?

_____NO. Why?

Detach poll and put it in the box by the Country Store. Results of poll will be reported in a flyer.

ANNOTATED BIBLIOGRAPHY

Materials Purchased by ESEA Title IV-C for use in PACE

Aaah's: Many Mini-Mini-Courses for the Academically Talented Student — Stages I,II,III

Dallas Independent School District, 2517 S. Ervay,Dallas, TX 75215

113 pp $10.00

Aaah's is part of a three volume set of curriculum materials especially designed for students in grades 4-8. In this volume are short courses on a variety of topics designed to broaden students' interests. By the end of the course, students should be thinking, "Hey, I know something about that!"

The primary objective of Aaah's is to capitalize and expand on sudden student interest. For instance, in the middle of a unit of study you may find a spark of interest that actually deviates from the main topic. The authors feel that it is sometimes wise to let students pursue a sudden interest for a short time before returning to the main course of study and Aaah's was written to meet this need. The lessons are organized and succinct with well defined objectives and clear examples. The units can be used with impressive results without elaborate preparations on the part of a classroom teacher.

Analogies A,B,C, & D

(See Basic Thinking Skills.)

Verbal analogies are presented in this series of four books. The analogies become more difficult as they progress. Book D contains analogies for which the first word is given and the student selects the remaining 3 words (from a list) to complete the analogy.

Antonyms and Synonyms

(See Basic Thinking Skills.)

The book begins with antonyms which students select from several given. After several sets of these, which progress from such words as clean, hot, to attract, positive, the student is asked to develop antonyms on his/her own, given a stimulus word. The same pattern follows for synonyms.

Antonyms, Synonyms, Similarities, and Differences

(See Basic Thinking Skills.)

Beginning where the previous book left off, the book goes on to present groups of words and the student is asked to tell what is similar or what the words have in common or what category they belong to (e.g. white, whole wheat, corn, banana = types of bread). In the remaining section of the book, a group of words is presented, one of which does not belong. The student identifies the category and the word which is out of place.

Asking Questions, Finding Answers

Stage II & III

Diane Draze
Dandy Lion Publications, Box 190, San Luis Obispo, CA 93406

70 pp. $7.00

This book is designed to help teachers guide children in the Independent Study process. The overall goals are to help children make decisions about the subject matter, time schedules, processes, & products of Independent Projects.

The activities are extremely thorough, beginning with observing and gathering information, and ending with individual and group evaluation forms. Children are given the opportunity to learn how to locate information and how to communicate that information. They are shown how to evaluate community resources, how to survey, and how to develop good questions.

This book provides good hints for teachers as well as lists of questions to ask children as they develop their topics. The activities include games, worksheets, and a variety of work forms. This book would be an excellent reference book for someone who has never taught Independent Study.

Attribute Games and Activities

Stages I, II

Maria Marolda
Creative Publications P.O. Box 10328, Palo Alto, CA 94303

155 pp $6.50

This comprehensive book provides activities to develop many mathematical concepts, including set theory, geometry, number theory, and logical thinking. The concept toward which each page is directed is listed in the table of contents.

In a separate packet included with this book is a set of Loop Activity Cards, Attribute Blocks, People Pieces and Color Cards.

The book is designed according to four learning stages from concrete, in which students respond to verbal directions by manipulating materials, to abstract, in which directions and responses are given in coded symbols.

The format of the book includes lesson plans, example pages, and student activity pages which may be reproduced or laminated. An appendix provides solutions to problems and puzzles. Directions for making game cards are also included.

Basic Thinking Skills

Anita Harnadek
Midwest Publications, P.O. Box 448, Pacific Grove, CA 93950

30 pp. each book $3.50 - book form
9.95 - ditto masters

Thirteen books in this series are designed to sharpen thinking skills. Each book contains about 30 activity sheets relating to the title/topic of the book. Students may use these as individual or group activities. We have found that students benefit from a group experience with these activities followed by individual practice.

Brain Scratchers

Stage III

(See Basic Thinking Skills.)

Richard Fawley and Eleanor Villapando
Think, Inc., 4131 N. 51 Pl., Phoenix, AZ 85018

55 pp. $7.50

Create your own puzzles from scratch! This book guides students (or teachers) through the process of planning and designing crosswords, mazes, word searches, and fill-ins. Directions, examples and reproducible work sheets are included. Students are encouraged to think critically and creatively as they develop their puzzles. Originality, flexibility, and elaboration are creative thinking abilities which are fostered by puzzle-making. Vocabulary and content knowledge are likely to increase as students prepare their puzzles. As puzzles are developed and given to other children, evaluations are sought, thus giving the creator an opportunity to revise if needed.

Teachers may turn this over to more able students to have them develop puzzles which go along with science, social studies, reading and spelling, as well as special topics in the class.

Brain Stretchers

Stages I,II

C. Anderson & J. Haller
Midwest Publications, P.O. Box 448, Pacific Grove, CA 93950

184 puzzles $6.95

These activities are designed to develop critical thinking skills in mathematics. Problems include patterns, (magic squares, cross-number, see what's different), logic (find the operation, find the path, decoding), and puzzles (geometric pictures, numbers mazes, hidden pictures).

Brain Stretchers provides the teacher with numerous spatial and numerical problems which are motivating to students.

This book provides a nice balance for all the verbal activity which characterizes most classrooms.

Bright Ideas

Stage III

Ellen Tan, Pam Piwnica, Sue Parker
Creative Teaching Press, Inc., Monterey Park, CA 91754

107 pp. $6.95

Originally implemented in a resource room for gifted students, these eleven units are complete and ready to be used. Background information, procedures and directions, excellent illustrations, and lists of materials are included in the units.

Topics include: Photography, Publishing, Poetry, Tower of Self, Geometric Line Design, Weaving, Machines, The Law, Physiology of Exercise-Body Fat, Physiology of Exercise-The Heart At Work, Physiology of Exercise-Blood Pressure.

Many of these units are quite involved. Students will need supervision while working through a number of the activities. However, the motivation for gifted students appears to be very high - thus it may be an appropriate trade-off for the teacher to find ways to group gifted students for some of these units.

Cause and Effect

(See Inductive Thinking Skills)

These situations provide opportunities for students to discuss cause and effect relationships. Reasoning errors relating to cause and effect are common in elementary school children, ("Step on a crack, break your mother's back"). Children participating in these activities learn to distinguish between cause and effect, to identify instances of coincidences, sequential events, related events, or simultaneous events being mistaken for cause and effect.

Conservation, Paths and Miscellaneous

(See Basic Thinking Skills)

These activities are generally appropriate for younger children. By using some of these, the teacher can determine, from a child's response, whether that child is able to conserve quantity (an important part of critical thinking).

CPS for Kids

Stage II

Bob Eberle and Bob Stanish
D.O.K. Publishers, Inc., 71 Radcliffe Road, Buffalo,
NY 12414

98 pp $7.95

CPS for Kids is a well organized and conceptually sound adaptation of the creative problem solving model developed by Osborn and refined by Parnes, Noller, and Biondi. This book fits well with the goals of PACE and the Three Stage Model.

Teachers will appreciate the clever, motivating activities and detachable worksheets. Activities are organized into six steps of creative problem solving: Sensing problems, fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding. There are five activities within each of the six levels; thirty activities in all. Most vary in length from twenty minutes to one hour.

Each activity is accompanied by a helpful teacher's guide sheet which states the objective clearly, suggests a motivating introduction, provides concise directions, and recommends extensions for the activity.

The activities are particulary helpful in giving children the kinds of experiences they need to conceptualize and plan an appropriate individual project or investigation. There are opportunities for observing, sequencing, classifying, evaluating information, asking questions, and developing written plans.

Creative Growth Games

Stages I, II

Eugene Raudsepp & George P. Hough, Jr.
Jove Publications, 757 Third Ave., New York, New York 10017

195 pp $3.95

This book is divided into two parts. Part I is a series of 75 games and exercises to stimulate, activate, develop, and strengthen the imagination as well as enhance creative problem solving skills. The exercises expose able students to a new way of thinking and alternative solutions.

Each exercise is introduced with a creative quote and an explanation of the relevance for creative growth.

Part II is made up of explanations and answers along with guideposts for creative problem solving.

The activities in the book are short term but may serve as a springboard to other ideas.

Critical Thinking

Stage II

Anita Harnadek
Midwest Publications, P.O. Box 448, Pacific Grove, CA 93950

178 pp. $9.95
$5.95 - teachers guide

Two areas not generally taught in many schools are logic and critical thinking, and yet we recognize as we get out in the "real world" that many experiences and life situations would be made less difficult if we were able to employ these skills. Critical Thinking presents a program for developing these skills in a class or group situation. Much of the program is based on group discussions.

The book contains introductory chapters on logic and critical thinking, basic concepts for critical thinking, errors in reasoning, propaganda techniques, advertising and schemes, examining arguments and value judgments, and learning to be open-minded.

Many examples of the various topics are presented, and the book contains approximately 1,000 problems and questions for discussion.

Design Yourself

Stages II & III

Kurt Hanks, Larry Belkston, Dave Edwards
William Kaufmann, Inc., One First Street, Los Altos, CA 94022

142 pp. $6.95

This is a book for visually-spatially oriented people. The fundamental concept is that of a design tightly interwoven with creativity and problem solving. Although the book is graphically and artistically focused, the sections on problem solving and ideation are applicable to all who are interested in creative thinking.

Interesting anecdotes about products and product development are included, as well as biographical information about Einstein (who was visually rather than verbally oriented). Stimulating quotations are liberally sprinkled throughout the book.

Teachers will use this book primarily as a resource to help them create/design activities and problem solving situations for students.

The book is very appropriate for those who are interested in developing right hemisphere function in the brain.

Detective Box

Stages I, II, III

Ruth Harring & Bill Armstrong
The Coal Bin, Inc., P.O. Box 265, Hastings, Michigan 49058

100 cards $14.95

Everybody loves a mystery! Able students are particularly inspired by detectives, clues, mysterious maps, and codes.

Detective Box is a learning center with activities tied to the theme of detectives, but based on the subject areas, primarily language arts, social studies and art.

The guide for teachers provides a list of activities with their subject matter area and productive thinking skills identified. Also, the box includes a list of materials needed for the activities (very helpful to the teacher planning the center).

Developing Creativity in Children

Stage I

Charles E. Schaefer
D.O.K. Publishers, Inc., 71 Radcliffe Road, Buffalo, NY 14214

100 pp. $4.95

This source book for teachers describes activities for developing creative abilities particularly in the language arts, the visual and dramatic arts, and creative (scientific) thinking. Many of the ideas are quite original and should be motivating to the more able student.

An interesting feature of this book is the inclusion of samples of student work in response to a particular activity.

This book may be especially appealing to teachers who are looking for ways to promote creativity in visual and dramatic arts.

Discovering Nature

Stage I, II, III

Educational Insights, 20435 South Tillman Avenue, Carson, CA 90746

133 cards $7.95

Major topics included in this nature study are an introduction to nature study, animal kingdom, plants, and ecology. Activities and projects are clearly described, step by step, with procedures and materials. Some projects require use of reference materials, some ask for observation of animals and plants. Many of the activities are such that students can proceed independently, others will require some teacher or parent supervision.

Earth Science Stages II, III

Educational Insights, 20435 S. Tillman Avenue, Carson, CA 90746

50 Activities $5.95

Topics covered in this kit include Earth, Volcano Activity, Atmosphere, Water & Erosion. The activities included are based on principles of inquiry and lead students to get background information, experiment, and think about the implications of the experiment. Divergent thinking is encouraged. Among the skills students will practice are observing, hypothesizing, record keeping, making conclusions, and communicating results.

Materials needed for the experiments include sand, rocks, magnifying glass, vinegar, candles, assorted tin cans and other easily obtained objects.

Some of the activities have students construct a seismograph, a convection box, a model of a sand dune, and a mountain.

The activities are easy to do, require very little supervision and are extremely motivating for able students.

Experiences in Visual Thinking 2nd edition teacher resource

Robert H. McKim
Brooks/Cole Publishing Company, Monterey, California 93940

170 pp. $18.95

Teachers will use this book primarily as a resource for activities in visual problem solving. The fundamental concept is that thinking involves a variety of modes including verbal, mathematical and visual problem solving. A major purpose of this book is to encourage flexibility in the individual's use of visual imagery as a means of problem solving.

Interesting examples of problems in perspective, optical illusions, and rotations as well as many other visual puzzles are included. Many of the fascinating examples can be easily adapted for use with students who find the unusual problems novel and intriguing.

The Face at the Window　　Stage II

Wolfgang Ecke
Prentice-Hall Inc., Englewood Cliffs, New Jersey

128 pp.　　$7.95

This book contains fifteen short mystery stories that can be solved by noting the clues - but watch out for false leads and irrelevant information. If you find you are stumped, the solutions appear at the end of the book. Some mysteries can be easily solved while others are more difficult. All of the stories are marked to indicate the degree of difficulty.

The stories have a few illustrations and can be read aloud to a group. They might also be used individually by students in an interest center. The stories demand good listening or reading habits, attention to important detail, and logical thinking.

52 Ways to Have Fun With My Mind　　Stage I

Leif Fern & Ursula Golisz-Benson,
Kabyn Books, Box 9663, Navajo Station, San Diego, CA 92119

$2.50

The ideas in this book serve as catalysts for creative thinking. The activities are basically language arts oriented with some figural activities as well.

The book is designed for students to own and use at their own pace. The activities are not sequential and the students are encouraged to do as much or little as they like.

These activities are appropriate for individual, small group, or large group work. Most activities can be quickly written on cards for larger group work.

Figure Relations A

(See Inductive Thinking Skills)

There are two types of problems in this book: rubber sheet problems in which student determines whether various shapes can be made under conditions stated, and line problems in which the student decides whether a line can be drawn under given conditions.

Figure Relations B

(See Inductive Thinking Skills)

These problems consist of triangles, rectangles, squares, and pentagons which the student mentally manipulates by rotating or flipping them and drawing the end result.

Figure Patterns

(See Inductive Thinking Skills)

All of these activities involve figural content, thus capitalizing on the non-language abilities of many students. Each page presents one or two figure sequences in which the first three figures are given and the fourth must be provided by the student. These activities provide skill development which should precede work in number sequences and patterns.

Flights of Fantasy — Stage I

Lorraine Plum
Good Apple, Box 299, Carthage, IL 62321

64 pp. $5.95
$7.95 Cassette

This book is designed to enhance and refine children's natural inclination to imagine and fantasize and to use this special ability as a vehicle to develop language, creativity, relaxation, and a positive self concept. It was written in an attempt to utilize right hemisphere brain function.

The book contains an extensive rationale, a description of how to use Flights of Fantasy, relaxation ideas, general ideas for sharing, and six topics. Each of these topics contains an introduction or motivation, a section called Specific Ideas for Sharing, a list of related books from children's literature, and several student activity pages for duplication.

The author urges teachers to select appropriate activities from the many suggested and to determine the sequencing of activities best suited for each class.

Four Sight Stage I

Invicta, LTD., 200 Fifth Avenue, NY, NY

$8.50

This game for two players consists of four templates, each with a different pattern of four holes, a playing board divided into 16 squares, and two sets of plastic tiles. The object of the game is to place your tiles on the playing board so that your template will fit over the board revealing three of your own tiles and one of your opponents. The game requires spatial visualization and mental manipulation of the template which may not be picked up before one is ready to place it on the board. Players in the game develop their own strategy and and attempt to see the strategy used by their opponents.

Future Think Stages I, II

John Krewer
Good Apple, Inc. Box 299, Carthage, IL 62321

61 pp. $5.95

Children need to develop the skills to cope with change; divergent thinking, decision-making, planning, looking at trends. Future Think leads the students through activities which relate to their own lives and which point toward the skills which will be used in the future.

A section on teaching tips suggests activities to go along with the concepts presented in the book. Discussion questions are included.

Many teachers are looking for futuristics materials to use with able students. This book provides a good foundation from which teachers can expand this area of study.

Games Magazine   Stage I

P.O. Box 10145, Des Moines, IA 50340
Bimonthly

$7.97

This magazine is probably the greatest single source of Stage I activities available. Not an issue goes by without yielding at least one super activity which challenges and stimulates the able student.

One excellent feature of this magazine is the balance between verbal and figural activities. There are mazes, visual perception problems, observation and memory activities, vocabulary developers.

Students frequently complete an activity and go on to make up one of their own.

We find that students enjoy taking home these activities to work on and share with their families. Teachers enjoy the activities because many can be related to the curriculum areas, thus providing motivating enrichment to the basic subject areas of math, science, geography, language arts, and social studies.

The Human Body   Stages II, III

Elayne Sidley & Darryle Purcell
Educational Insights, 20435 S. Tillman Avenue, Carson, CA 90746

50 Activities $5.95

Experiments and demonstrations in thirteen topical areas of the human body should motivate students to further study. The areas are: Skin, Bones, Teeth, Muscles, Heart, Lungs, Cells, Digestion, Eyes, Ears, Speech, Brain, and Physiognomy.

Most of the activities may be done individually with materials such as rulers, cornstarch, vinegar, jars, rubber bands, etc. Several activities should definitely be supervised - for example, a "blind walk", and an activity to determine how fast hair grows, which suggests shaving a small area on ones arm.

The activities are very involving, asking students to observe and record information, and experiment to determine the effects of sugar on teeth (using a tooth which is already out, of course), the amount of air taken into the lungs, and the variation in temperature patterns among students.

I Believe in Unicorns Stages I, II

Bob Stanish
Good Apple, Box 299, Carthage, IL 62321

105 pp $7.95

This book is designed to develop and strengthen the four creative thinking processes of fluency, flexibility, originality, and elaboration. Many of the activities involve writing, open-ended discussion, and brainstorming. A teacher page offering suggestions accompanies each student page.

Inquiry, brainstorming, and SCAMPER techniques are reviewed and utilized. A scoring guide is introduced to enable students to inventory creative thinking throughout the year and evaluate their growth.

The activities are varied and clever. They may be used in Stage I and II or scattered throughout the year.

The I in Independent Study Stage III

Dallas Independent School District, 2517 S. Ervay, Dallas, TX 75215

42 pp. $2.50

This manual may be used to help teachers and students organize and carry out independent study. The manual is directed at students and accompanies the teacher's manual of the same title.

A fourteen step process is presented in three categories titled Getting Started, Search and Research, and Presentation. Most of the fourteen steps are presented with examples and activities to provide the organizational framework for students.

The fourteen steps include: selecting a topic, narrowing the topic, preliminary research, bibliography, note-taking, interviewing, organizing data, formal outline, selection of media, planboard, artwork, creating a film, and meeting the challenge.

Imagination Express: Saturday Subway Ride

Stage II

Gary Davis
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

100 pp. $3.95

This book is helpful in learning to stretch your mind so that you can solve problems, create new things, improve old things and enjoy the process.

The program is built around an imaginary subway ride presented in story form with duplicated exercises for students to participate in. The exercises guide the students in creative activities such as writing a song, writing dialogue, creating a new language, brainstorming, and using various problem solving techniques. The activities are primarily language arts oriented.

The books and activities are written very humorously and will appeal to teachers and children who like to mix learning and laughter. The story is written to be read aloud to students in sections, interspersed with the activity sheets. The entire program, which could take several weeks, is a jumping off place for problem solving and creative thinking.

Inductive Thinking Skills

Stage II

Anita Harnadek
Midwest Publications Co., P.O. Box 448, Pacific Grove, CA
93950

Approx 28 pp.	$3.50 book
each book	$9.95 ditto masters

There are eleven books in this series which are designed to be used for discussions. Skills include recognition of patterns, ability to generalize, seeing the broad picture, drawing reasonable inferences, reasoning by analogy, and recognizing cause and effect. Students are encouraged to speculate as to what would happen if...? What might be done about...?

There are several books which contain spatial perception activities; other appropriate topics are creativity and discovery.

Inferences A

(See Inductive Thinking Skills)

Students learn what inferences are and practice identifying reasonable inferences from presented situations. Discussions allow students to probe and to clarify reasoning.

Inferences B

(See Inductive Thinking Skills)

These problems will involve the students in lively discussions. The role of the teacher is to probe and question student responses. Problems are motivating and realistic. Students will realize, through interaction, that what may seem to them to be a reasonable inference may be reasoned differently by other students.

Insects

Stages II, III

Marian Williams and Ruby Obrero
Educational Insights, 20435 South Tillman, Carson, CA 90746

50 Activities $5.95

These inquiry-oriented activities help students develop skills of observation, inference, and record keeping, to name several. Students may progress independently through this program, collecting specimens, reading about insects, experimenting, comparing insect and human abilities.

Various materials, easily obtained or constructed, are recommended for containing insects for observation. Quizzes (using fairly low level questions) check student understanding of the material and concepts presented.

With highly able students, it is recommended that encouragement be given toward further hypothesizing, advanced experimentation, and higher level question development.

The Investigation of Real Problems

Stage III

Therese Vezza and Michael T. Bagley
Educational Institutes and Consulting Associates, Inc.
Box 595, Woodcliff Lake NJ 07675

190 pp. $14.95

This material is designed to assist teachers in selecting interesting and stimulating real-life problems to involve able students in independent study. It offers a wide variety of problems to investigate, as well as excellent and varied ways of conducting research and presenting results. An extensive list of references is included for each of the topics to assist students in locating information. Among the topics included are Endangered Species; Our Energy Problem; Life in Outer Space; Food, Its Use and Abuse in Today's Society; and Ecology. Many of the topics are appropriate for study by third through sixth graders and the variety of research methods suggested prepares students to investigate questions in many ways.

It's Me...You'll See

Stage I

Gary D. Grimm
D.O.K. Publishers, Inc. 71 Radcliffe Road, Buffalo, NY 14214

64 pp. $2.95

A combined focus on self concept, creative thinking, and values characterizes this book. The first half develops those concepts for the teacher and suggests a plan for using the second half of the book which is a series of student activities. These activities encourage the students to draw pictures of themselves and their friends and families, reflect on things that make them happy, things that "bug" them, feelings about people, holidays, foods, animals, etc. These pages are reproducible and can be used in various combinations and for various purposes by the creative teacher.

It Takes Teaching: A Systematic Approach to Independent Study

Stage III

Dallas Independent School District
2517 S. Ervay, Dallas, Texas 75215

49 pp. $3.00

This is a teacher's manual designed to accompany the student book *The I in Independent Study*. It provides an excellent overview of the independent study process, organizing independent study into a logical, sequential progression with an emphasis on the necessary skills and abilities to be developed. This book imparts a background of knowledge to independent study.

The Know How Book of Codes, Secret Agents & Spies

Stages I, II

Falcon Travis and Judy Hindley
Sterling Publishing, Inc., 419 Park Av. South, New York, NY 10016

47 pp. $4.95

This book contains clever codes which students can easily master, disguises which could be used in plays or skits, a manual alphabet, Morse code and some amusing ideas for secret post offices. Students enjoy the challenge of decoding and encoding messages as well as reading about various "spy activities." Many students will be stimulated to develop their own codes and procedures.

The Language Arts Idea Book

Stage I, II

Joanne Schaff, Goodyear Publishing Co., Santa Monica, CA 90401

Packed full of creative language arts ideas, this book is a welcome addition to any teacher's professional library. Activities are organized by skill (listening, speaking, expanding vocabulary and creative writing) and by grade levels.

Descriptions are sufficient to get started and many ideas are truly original.

With highly able children, a teacher could present many of these activities in a learning center format. Many of the activities are such that students can add to them over a period of time.

Learning Through Creative Thinking

Stages I, II

Dr. M. Ann Dirkes
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

70 Activities and
Teacher's Guide $3.95

The activities in this packet are designed to promote transfer across curriculum areas by providing experiences with brainstorming. SCAMPER-ing, choices and decision making. Certain of the activities are sequential in nature, requiring students to build on skills introduced. Both verbal and figural content are included in the activities and students have options for the type of presentation they make.

The activities are designed to be used by individuals or small groups, although the teacher might choose to present certain of the developmental or skill building activities to the entire group.

Learning to Think and Choose

Stage II

J. Doyle Casteel, Goodyear Publishing Company, 1640 Fifth St.,
Santa Monica, CA 90401

161 pp $10.95

Development of decision-making skills, valuing skills, and group discussion skills are among the most important learning activities of the highly able student.

Through use of motivating, realistic situations, students are guided through decision-making processes using five types of value formats: forced choice, affirmative, rank order, classification, and standard. Students have opportunities to make individual decisions and to reach group consensus.

Instructions are provided for teachers, including a step-by-step checklist for developing your own value sheets in the content areas.

Magnetism and Electricity Stages II, III

Burt Cutler and George Taevs
Educational Insights, 20435 South Tillman Ave., Carson,CA 90746

50 Activities $5.95

One of the most appropriate sets of materials for more able students, this kit presents experiments which ask students to write their observations and conclusions. Each experiment or demonstration is followed by a "head stretcher" which asks the student to go further in his/her thinking, to speculate, to hypothesize.

Materials needed for these activities include magnets, iron filings, dry cell batteries, a cork ball, various types of cloth, and aluminum foil,to name a few.

Even if a teacher decided to use these materials with the whole class, the extended activities are appropriate for the more able student. Students can make their own magnets, electromagnet, electroscope, battery, telegraph set electric quiz game, rheostat, and 3-way circuit.

Mathematical Puzzles and other Brain Twisters Stages II, III

Anthony Filipak
Bell Publishing Company, One Park Avenue, NY, NY 10016

120 pp. $5.95

While many books are available which present puzzles for solving, this book, in addition, presents the instructions for actually constructing them. The puzzles in this book are primarily mechanical and manipulative, organized in the following manner: shifting block puzzles, straight line peg puzzles, checkerboard puzzles, string puzzles, wood design puzzles, and geometric design puzzles, to name a few.

This book appeals to those individuals who enjoy the non-verbal, spatial activities and challenges and those who enjoy handcrafting.

These activities are such that, once constructed, they may be included in a learning center or independent study area. Constructing the puzzles would be a good project for students under the guidance of a teacher or volunteer with woodworking expertise and tools. Excellent for practical application of measurement and related skills.

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Mathematics through Creative Thinking Stage II

Dr. M. Ann Dirkes
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

51 Activities & Teacher's Guide $3.25

One does not usually relate creative thinking and mathematics because we think of math as convergent activity (one right answer) and creative thinking as divergent activity (many possible solutions).

This packet was written to help students produce mathematical ideas without interference, therefore brainstorming, coming up with alternative ideas, estimating, guessing, are all techniques which are encouraged. The activities are exciting and non-threatening. They should help reduce the anxiety which some children (and adults) feel when faced with a math problem. Topics covered include fractions, geometry, measurement, and estimation.

The activities are on cards which can be used individually by students, or the teacher may wish to present the activities in math groups.

Mind Teasers Stage II

George J. Summers
Sterling Publishing Co. Two Park Ave. New York, New York 10016

128 pp.

These logic puzzles help students develop skills in logical thinking. The activities are challenging and provide a variety of approaches to logical elimination.

The only materials needed for these activities are paper and pencil. Students attempt each puzzle before turning the page for some HINTS for solution. If the hints are not enough, a discussion is included as well. This provides a more detailed explanation of the logical elimination process. Once a solution is found (or not found) the "Solution" section provides an extremely detailed explanation of the solution.

This book is a good source of puzzles for a small group with the teacher using the hints to guide the students to a solution. The activities could also be adapted to a learning center format. As an outgrowth of this, students may make up their own logical elimination puzzles.

Miscellaneous, Including Transitivity and Same Person or Not

(See Basic Thinking Skills)

These activities ask the students to decide whether relations such as "is taller than", "yells louder than", are transitive. Other problems ask students to decide whether certain pieces of information are mutually exclusive. There are also elementary logic problems in this set.

Monster Box

Stages I, II

Mary Ann Anderegg, Regina McClurg, Ruth Harring, Bill Armstrong
The Coal Bin, Inc., P.O. Box 265, Hastings, MI 49058

60 Activities for Students	
20 How to Cards for Teachers	$14.95

Monsters! is the theme for this collection of cards. Curriculum areas of language arts, math, science, social studies, and art are included in the activities which also develop thinking skills such as analysis, interpretation, inference, problem solving, and hypothesizing. Creativity is emphasized in many activities which focus on imagination, translating, and creating. Instructions and information for teachers include hints on getting started, lists of materials to have on hand for the activities, and a set of cards instructing teachers on how to do grave rubbings, how to turn a fish carcass into a skeleton, how to dry mount, how to stage a shadow play, and other related activities.

Some of the student and teacher activities seem only peripherally related to monsters, but are quite stimulating. Student cards give minimal instruction or motivation so students are on their own for the most part.

More Creative Growth Games

Stages I, II

Eugene Raudsepp
G.P. Putnam's Sons, 200 Madison Ave., New York, New York 10016

201 pp. $4.95

This book consists of 75 stimulating games and exercises designed to develop creative imagination, visualization and imagery, divergent thinking, metaphoric thinking, persistence, synthesizing ability and many other attributes of creative thinking and problem solving.

Part II gives answers and examples as well as additional explanations of their practical usefulness.

Part III takes a new look at the creative process and creative efficiency.

Notable Numbers

Stages I,II

William T. Stokes
Creative Publications, P.O. Box 10328, Palo Alto, CA 94303

107 pp. $5.95

Enrichment classes for able students often neglect the area of mathematics. This book provides activities to use with able students in the discovery of the relationships which exist between numbers. Some of the areas presented are Venn diagrams, Pascal's triangle, divisibility rules, exponents and bases.

The pages in this book can be used as masters for activity sheets and transparencies. The book also includes a bibliography for further study by the teacher.

Many able students are fascinated by the existence of number patterns and realationships. This book is designed to take advantage of that fascination and to present mathematical concepts and theory usually overlooked in the traditional classroom.

101 Product Ideas

Stage III

Jacquelyn McCubbin
Thinking CAPS, Inc., P.O. Box 7239, Phoenix, Arizona 85011

101 pp. $9.95

This colorful book provides students with 101 suggestions for ways to display the final product of an independent project. Product ideas range from relatively simple diagrams to survey construction.

Each idea is presented separately on a single page and is accompanied by an example.

101 Product Ideas is particularly useful for younger children who have limited experience is selecting appropriately challenging projects and interesting ways to present them.

100 Ways to Enhance Self-Concept in the Classroom

Stage I

Jack Canfield and Harold Wells
Prentice-Hall, Inc., Englewood Cliffs, New Jersey

253 pp. $9.95

Building positive self-concept is a good theory but often we need practical and concrete ways to invite people to feel better about themselves. This book is practical! The authors provide 100 clever and exciting ways to encourage young people to view themselves more positively. Most of the activities are brief and could be used during a 10-20 minute time period.

The book also includes a brief introduction on self-concept theory, special sections for teachers and parents, a guide to resources, humorous cartoons and inspiring quotes.

Open Ended Problems

(See Inductive Thinking Skills)

Students will become comfortable in expressing themselves in situations where there is not one correct answer. Some of the problems are common to students in elementary and secondary school, others require more background information than many elementary students have, although the more able students may do well on these.

The Other Side of Reading Stage I

Joe Wayman
Good Apple, Inc., Box 299, Carthage, Il., 62321

144 pp. $9.95

The purpose of this book is to present activities which develop the right hemisphere of the brain - the side which seems to be the intuitive, spatial, visual, and concrete. Through stimulation of this hemisphere, children will learn to visualize what they read, thus developing the skill of Imagery.

The book, which may be duplicated, provides opportunities to build skills of pattern completion, visual sequencing, visual synthesizing, and visual recall. Activities include mazes, tangrams, mirroring, and numerous other visual, perceptual, and spatial activities.

The activities in this book are appropriate for individuals, small groups, or large groups. The sheets would be especially useful in an interest center.

Patterns

(See Basic Thinking Skills)

Welcome to the world of "bubocs" and "tubbels." The purposes of these pattern activities are to train the observational skills of the students and to help them recognize the critical attributes of the various patterns. Later in the book, students work with number patterns (find the numbers to complete the series).

Plants

Stages II, III

Alex Balian and Mark Falstein
Educational Insights, 20435 S. Tillman Ave., Carson, CA 90746

50 Cards $5.95

This activity box contains information, activities, and experiments appropriate for individual, independent study. Categories include What is a Plant?, The World of Plants, Grow Your Own, Flowers, Leaves, Projects, Games and Puzzles.

Most of the activities require materials which are easily obtained (soil, egg cartons, milk cartons, seeds). The instructions are simple and can be carried out with little or no supervision. Extended activities are suggested on many of the cards and the more able student should be challenged to carry out some of them.

Students are encouraged to use art as a medium of expression for a number of their projects. Realistic outgrowths of projects are suggested, such as having a poster contest to promote understanding of how plants help people, labeling nearby trees, making a bird feeder using pine cones and peanut butter.

Promote

Stage III

Patricia Weber
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

32 pp. $2.00

This simple outline guides students through seven steps to preparing a research project. Each letter in the title stands for one step: pick a topic & set the pace; read, research, record, use references; set objectives, observe, outlines, look at options; write manuscript, modify, memorize, make 'n do; organize for presentation, originality check; transform, teach, talk, tell, test,; evaluate, enjoy.

Each of the steps is elaborated in the rather brief text. As with the other book by this author (Question Quest), the format is somewhat distracting.

The text is handwritten and rather cluttered, but the content could be very helpful for students preparing independent study projects.

Question Quest Stage II

Patricia Weber
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

32 pp. $2.00

Here is a method of developing question asking skills in students. The basic organizer for the questions is Bloom's Taxonomy. Descriptions of each category and examples of key words and questions are presented.

The format of the book is distracting (it appears that the author sat down and scrawled the text, occasionally doodling in the margins), but the information is basically good - at least for creating awareness of the levels in the taxonomy.

A teacher might put this book in a learning center or use it as reference for guiding the students to develop questions. Somewhat confusing is the fact that the author has made the questions into statements, e.g. "Define what is meant by civil rights.", thus the questions emerge resembling behavioral objectives.

Reasoning by Analogy

(See Inductive Thinking Skills)

In the 27 situations posed in this book, the students decide what analogy is being used, whether it is a good one, and the reasons for their decision. Many of the problems examine advertising claims, school and family situations and evaluation of characters' reasoning.

Relevant Information

(See Inductive Thinking Skills)

Each of the 20 situations is followed by a series of statements which the students are to evaluate in terms of their relevance to the stated problem.

Roll-a-Role

Stage I, II

Ungame Co., 1440 S. State College 2D, Anaheim, CA 92806

Game for Groups $10.95

This activity combines various characters in settings with topics for discussion. The role planning allows students to explore ideas of concern, put themselves in the place of other characters reacting from their perspectives, and deal with differing points of view.

Caution: The discussion topics are on cards which are drawn. Some of these topics are mature (and are identified as such), others may not be topics which the teacher or children are comfortable with. Teachers should go through the cards prior to using Roll-a-Role.

Scamper

Stage II

Robert Eberle
D.O.K., 71 Radcliffe Road, Buffalo, NY 14214

62 pp. $2.50

Games for imagination development and creative thinking are based on scripts read by a leader to a group of participants. The scripts call for the players to respond, create, pretend in their minds with their eyes closed. The scripts focus on cardboard boxes, zoos, doughnuts, stuffed animals, among others. The techniques used ask participants to substitute, adapt, reverse, magnify, modify, put to other uses, and eliminate familiar objects in their imaginations.

Student responses to these activities are very enthusiastic. They quickly become involved and willingly share their reactions at the end of the experience.

Teachers who enjoy using imagination activities will find SCAMPER an excellent book. The Scamper techniques can also be applied to other imaginative activites.

Secrets & Surprises

Stage I

Joe Wayman and Lorraine Plum
Good Apple, Inc., Box 299, Carthage, IL 62321

96 pp. $7.95

The major premise of this book is that "language development is more than an intellectual process - it involves the emotional and physical aspects of personality as well".

Activities in this book (183 of them) involve the student's whole body as well as the imagination. They are designed to be used by groups of students for 5-10 minutes at a time, in an area large enough for students to have space around them. The activities are structured and directed by a leader (usually the teacher).

Specific objectives of the activities are imagination development, creative thinking, listening, and positive self-concept.

Teachers and students who enjoy drama, movement, and imagination will be very excited by this publication.

Self-Starter Kit for Independent Study

Stage III

Edith Doherty & Louise Evans
Special Education Associates, P.O. Box 9497, Austin, TX 78766

157 pp. $14.00

This manual serves as a guide for teaching the skills of independent study. The Independent Study Process (I.S.P.) consists of three phases: Teacher-led, Independent Study, and Seminar.

The emphasis of this manual is on the second phase which is presented in nine steps: selecting a topic, establishing a schedule, developing questions, securing references, researching the topic, developing final objectives, conferring with the teacher, making a product, and displaying and evaluating the product. Lesson plans and game cards follow each step. Guidelines are set forth for each step.

Although the book is not well indexed, it is a valuable resource for Stage III.

Serpent Box Stages I,II,III

Regina McClurg, Ruth Harring, Mary Ann Anderegg, Bill Armstrong
The Coal Bin, Inc., P.O. Box 265, Hastings, MI 49058

80 student activities
20 teacher activities $14.95

Children are fascinated by snakes and this kit capitalizes on their interest. Many imaginative activities are presented around the themes of creative expression, arts, reading and research. Teacher cards suggest art projects, motivators, word searches, learning centers, transparencies, and dioramas, and many more projects.

72 Ways to Have Fun with My Mind Stages I, II

Leif Fearn
KABYN Books, P.O. Box 19663 Navajo Station, San Diego, CA 92119

$2.50

The purpose of this book is to help the learner develop a variety of thinking behaviors. It is described as a collection of catalysts for learning to think. While very much oriented toward language arts activities (reading, spelling, vocabulary, writing, literature), there are excellent activities in math, science, perception, history, and aesthetics.

The activities are challenging, stimulating, and varied. Many of them call for long term involvement on the part of students, while others can be done in a relatively short time. These activities are particularly suited to gifted/creative students because of their complexity, their appeal to the imagination and curiosity of the learner, and the perseverance and risk taking required by most tasks.

Teachers can use this book to suggest activities for gifted individuals or small groups. Most activities can be quickly written on cards or papers, or perhaps posted on a bulletin board.

62 Ways to Have Fun with My Mind

Stages I, II

Leif Fearn, Ursula Golisz-Benson
Kabyn Books, P.O. Box 19663, Navajo Station, San Diego, CA 92119

72 pp. $2.50

The ideas in this book serve as catalysts for creative and productive thinking. Responses to the ideas are divergent as well as convergent and may be presented in graphic or verbal form. Many of the ideas will stimulate students' curiosity and send them to various reference books; other ideas will cause students to sit with paper and pencil, puzzling over word or number challenges. This book contains no answer key, so persistence is the only way for students to find out if they are correct.

These activities are appropriate for individual, small group or large group work. No materials, other than access to a good reference library in some cases, are required. These are among the most challenging, stimulating activities I have reviewed.

The Solar System

Stages II, III

Educational Insights, 20435 S. Tillman Ave., Carson, CA 90746

50 Activities $5.95

This file of individualized study cards presents facts and concepts, experiments, demonstrations, and activities on various topics relating to the solar system.

Areas included are sun, planets, earth, gravity, comets and meteors, stars, telescopes, moon, tides, eclipse, and astronomy symbols.

The facts are concisely presented and should give the student enough information to direct him/her to further study.

The experiments and demonstrations, using easily obtained materials (apple, crayon shavings, etc.), are excellent methods of explaining and/or verifying such concepts as the earth's rotation, gravity, and seasons.

Creative thinking is facilitated in a number of activities by suggestions that students create a theory, imagine a future civilization, or work with a legend.

Spatial Perception A

(See Inductive Thinking Skills)

This book presents spatial problems which are to be solved mentally. Some involve visualizing the result of folding or unfolding a sheet of paper, others ask whether or not a floor can be tiled using tiles of various shapes.

Students are asked to draw the end results of these exercises.

Spatial Perception B

(See Inductive Thinking Skills)

This book presents problems which involve visualizing three-dimensional figures and manipulating them. Students also mentally fold various hat patterns to make three-dimensional figures.

Sunflowering

Stages I, II

Bob Stanish
Good Apple, Inc., Box 299, Carthage, IL 62321

89 pp. $7.95

Analogy is the basis for these hundreds of ideas. Creative thinking and imagination are emphasized as students become involved in responding to unusual questions or stimuli.

Among the most divergent, open-ended materials published for educational purposes, this book requires a teacher who is comfortable with metaphor, analogy, imagery, and the absolute absence of convergent thinking.

Gifted students respond to these activities enthusiastically, reveling in the opportunity to consider such questions as "In what way is a ball point pen like a subway?", and "What if everyone looked the same?".

Activities involve writing, coloring/drawing, creatively using catalogs/magazines, observing and listening.

Survival Skills on a String

Stage III

Eleanor Villalpando
Think, Inc., 4131 N. 51 Pl., Phoenix, AZ 85018

50 Cards
(11 x 17) $12.95

There are ten activities which emphasize record keeping and predicting, introduce scientific principles, and develop critical and creative thinking. Each activity contains a list of materials and procedures, steps in carrying out the activity, extensions of the basic activity, and a statement of concepts and skills with extensions of creative thinking.

The activities are extremely motivating, require common materials (cardboard tubes, ping pong balls, mothballs, baking soda, food coloring, etc.), and actively involve the students. The concepts of surface tension, buoyancy, angle of incidence and reflection, potential and kinetic energy are a few of those which are presented in the activities.

These activities would be effective in small groups.

Tangramath

Stages I,II

Dale Seymour
Creative Publications, Inc., P.O. Box 10328, Palo Alto, CA 94303

126 pp. $5.75

The title of this book suggests its intent: to utilize the manipulation of materials, coupled with the natural fascination with puzzles, to teach mathematical concepts. The tangram is the teaching device.

The concepts discovered and discussed include size, shape, congruence, similarity, properties of polygons, symmetry, and area. The number of activities per concept allows for sufficient experience and review to justify the use of the book as the main source for presentation of the concepts. Selected activities may also be used to reinforce concepts previously presented.

Each of the three parts of the book concludes with a page of open-ended suggested activities for extension of the concepts and for creative expression.

The pages of the book are perforated for removal so that overhead transparencies and work pages for students may be made. Solutions for activities appear at the end of the book.

Each page includes sufficient information and directions for the students to understand the activity and the concepts. Appealing cartoon figures present this information.

Tangram Patterns Stages I, II

Thomas E. Foster
Creative Publications, P.O. Box 10328, Palo Alto, CA 94303

159 pp. $6.00

This book presents tangrams (7-piece puzzles) to be solved by students. It may be used with Tangramath to reinforce mathematical concepts, or it may provide more tangram puzzles for students who enjoy them. The book provides a pattern for making tangrams.

The book is divided into four sections. The first shows tangram puzzles, outlining every piece. The second section shows the outline to be covered but does not indicate exact location of each piece. In addition, fewer than seven pieces are used. The third section uses all seven pieces and provides only the outline and the fourth section contains reduced outlines and puzzles using two sets of tangram pieces. Within each section, the puzzles are arranged in order of increasing difficulty, although the judgment of difficulty varies among students.

The patterns are clear drawings that may be reproduced for each student or laminated for math labs or learning centers.

Teaching for Thinking: 311 Ways to Cause Creative Behavior Stage I

Leif Fearn
Kabyn Books, P.O. Box 19663, Navajo Station, San Diego, CA 92119

183 pp. $7.25

"What this book is about is thinking", the author tells us in his introduction. More specifically, the book is about creative thinking. Theories of learning and thinking (Bruner, Piaget, Bloom, Guilford, Mecker, and Williams) are presented. Activities are described in a section titled Classroom Operations in Creative Thinking which includes numeric matrices, vocabulary, geography, futurism, quotables, aging, and group problem solving.

This book fits well with the goals of PACE and the Three Stage Model. The information and descriptions of the components of creative thinking (awareness, fluent thinking, risk taking, doing things with data, flexible thinking, etc.) are helpful to classroom teachers, as is a chapter on creative teaching. Several bibliographies of sources and resources of information about creative thinking skills and ideas for the development of creative thinking skills are included in Teaching for Thinking.

Tessellations: The Geometry of Patterns Stage I

Stanley Bezuszka, Margaret Kenney, & Linda Silvey
Creative Publications, P.O. Box 10328, Palo Alto, CA 94303

150 pp. $7.50

This material extends geometric concept development by focusing on patterns in geometric figures. These patterns are based on reflections, rotations, and translations. This material is appropriate for introducing geometric concepts or for providing continuing learning experiences in a novel way.

Think About It

(See Basic Thinking Skills)

These problems are designed to promote the use of common sense. They are excellent for discussions of lines of reasoning. The variety of problems in this book is exciting and students will respond positively to the "real life" application of some of them.

Think Big! Stages I, II

Martha Symonds
The Learning Works, P.O. Box 6187, Santa Barbara, CA 93111

76 pp. $6.95

Development of cognitive skills, encouragement of creative thinking, and expression of unique approaches and solutions to specific tasks and problems are the stated purposes of this book.

Fifty-five projects, cleverly illustrated, involve students in comprehending, inferring, synthesizing, analyzing, classifying, applying, predicting, evaluating, and recalling.

Students have opportunities to solve mysteries; design vehicles, license plates, and pet houses; check their memories; and evaluate information.

The projects may be duplicated for classroom use. Very few of them have a "right" answer, therefore students are encouraged to create their own responses and compare ideas with each other.

Most activities are short term (less than 1 hour), but may extend to other ideas. Since the basic objective of each activity is printed at the top of the page, teachers may select activities for specific purposes.

Thinker Sheets

Stage I

Becky and Charlie Daniel
Good Apple, Inc., Box 299, Carthage, IL 62321

62 pp. $5.95

Although the primary purpose of this book is to provide opportunities for children to follow directions, there are some activities which are challenging to younger gifted students. The language arts area is the focus of most activities. Many of the responses can be drawn rather than written. Vocabulary, unscrambling words, classification, and word searches are a few of the types of activities presented.

Sheets may be reproduced for classroom use.

Thinklab

Stages I,II

K.J. Weber
S.R.A., 7200 S. Leamington, Chicago, IL 60638

125 cards $84.00

The activities in this kit are designed to promote thinking and problem solving. While the kit was developed for and tested in elementary and secondary regular and remedial classrooms, it was found to be effective in stimulating the bright student.

There are five basic categories of problems: object manipulation, perception, creative insight, perceiving image patterns, and logical analysis. In addition to the cognitive skills, the kit also motivates and develops reading skills.

Students may work on the activities individually or in small groups. There are many opportunities for the groups to work together and share strategies and ideas.

Thinklab is an excellent kit for promoting creative thinking, problem solving and reading. It is highly motivating and can be used with a minimum of teacher direction.

Thinklab 2 Stages I, II

K.J. Weber
SRA, 7200 S. Leamington, Chicago, IL 60638

160 cards $111.00

Thinklab 2 is designed to improve thinking skills and encourage imagination. Although the guide states that it is for students from early adolescent to adults, we have found the kit to be very motivating and challenging to highly able intermediate students.

Thinklab 2 contains 6 different kinds of problems: object manipulation, creative insight, logical analysis, quantitative thinking, brainstorming (group activities) and just for fun.

These activities can be done by students individually, at various times, or a teacher might set aside a special time to work on these creative and logical problems. We have had success teaching strategies for creative problem solving in a group using a number of these problems.

Think Tank Stages I, II

Diane Draze
Dandy Lion Publications, San Luis Obispo, CA

17 pp. (text) $5.95
10 pp. (materials)

Think Tank is a simulation game which approximates conditions existing in many businesses and industries. The game is structured and takes a minimum of three 60 minute sessions to complete. Important creative strategies and techniques are practiced (brainstorming, fluency, flexibility and elaboration).

There are extensive guidelines and suggestions for teachers and a description for the background information for students. Students are involved in negotiating, quality control and product development.

Teacher direction is needed for this activity.

Tomorrowise

Stages II,III

Teddy Meister
Think Ink Publications, 3241 North 44th St., Phoenix, AZ 85018

62 pp. $7.50

This is one of the better resources for teaching future problem solving. It presents a variety of strategies with a futures theme, including planning and designing robots, future transportation, spaceships, moon bases, time capsules, and many more. Students are introduced to such future concepts as trend extrapolation, prediction, and forecasting. Tomorrowise promotes creative thinking and problem solving by able students.

To Teach for Thinking: Mini-Courses for Academically Talented 4-8 Students

Stages I,II,III

Dallas Independent School District, 2517 S. Ervay, Dallas, Texas 75215

3 Volumes $10.00 each

Topics are arranged in short, self-contained units designed to involve students in active inter-disciplinary learning. The primary emphasis in each lesson is on strategies for engaging students in higher level thinking. Each volume has a different focus. There is one on communications, one on math and science, and one on social studies. As the title implies, the units are appropriately differentiated for able students.

Up Periscope

Stages II, III

Dallas Independent School District, 2517 S. Ervay, Dallas, TX 75215

162 pp. $10.00

This is a book on research methodology based on teacher-developed activities which introduce the concepts in scientific and social science research. The activities emphasize the excitement of formulating hypotheses, collecting and analyzing data, and reporting results in graphic and written form.

Through sample research activities, students learn to conceptualize and carry out historical, descriptive, developmental, case and field, correlational, causal-comparative, true experimental, quasi-experimental, and action research.

What Are My Chances Book A Stage II

Albert P. Shulte and Stuart A. Choate
Creative Publications, Inc., P.O. Box 10328, Palo Alto, CA 94303

97 pp. $5.95

The activities in this book are designed to promote mathematical thinking and problem solving. The concepts covered in the 73 activity sheets are: organized listing; the meaning of probability; how to calculate and express probabilities in fraction, decimal, and per cent form; the Law of Large Numbers; and the use of surveys to predict future situations.

Although a few of the activities require polyhedra dice, most of the activities require only paper and pencil or colored counters (like the pieces from a Tiddlywinks or Master Mind game).

Teachers will appreciate the brief and informative discussion of the probability concepts found in the teacher notes for each activity.

The activities are easy to duplicate although many are suitable for group discussion and hands-on manipulation without the use of students dittos. There are several stimulating acitivities to demonstrate each new concept, so teachers may select from among a number of different options. Children find the clever situations presented in the problems highly motivating.

What Would You Do? and True To Life or Fantasy?

(See Basic Thinking Skills)

Situations in this book ask students to evaluate the problems in terms of what the character should do and also in terms of what the student him/herself would do in the same situation. The situations are the kind in which the students may find themselves at some time. Role playing and discussion are appropriate methods of working with these activities.

True life or fantasy situations ask students to decide whether the information presented is more likely to be true to life or more likely to be fantasy.

Wordsworth

Stages I,II

Invicta, 200 Fifth Avenue, NY, NY

Game for 2 Players $9.95

Along the lines of Master Mind, this game for 2 players allows one person to hide a mystery word (up to 5 letters) and the other player to try to decode the word using deductive reasoning skills. Feedback is provided by the first player as the second player makes attempts at determining the hidden word.

Strategies can be developed for narrowing down the letters and their positions.

This game not only sharpens deductive thinking skills, it also reinforces vocabulary skills.